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ISSUE 151 JULY 2014

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Develop Conference guide

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Using procedural generation

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EDITORIAL

DID YOU HEAR THAT?

I'VE RECENTLY BEEN playing Eidos Montreal's reboot of *Thief*, one of my all-time favourite franchises. There's plenty I love about the new game, but unfortunately there's one area where it undeniably falls short: the sound.

Loud conversations suddenly trigger when you enter certain rooms, even though there's no-one in the vicinity. The banter between guards gets stuck in loops, with dialogue echoing slightly as voice files restart a second later. Even the wispy, shadowy noise designed to warn you that you may be detected kicks in when you're completely alone or concealed, throwing off the atmosphere of an otherwise immersive stealth game.

It's a prime example of why sound design requires so much care and attention in games today. Granted, audio teams are at something of a disadvantage: while people applaud high quality rendering, post-processing, animation, performance capture and all the visual-centric areas where developers are pushing the boundaries, it's only when sound is handled poorly that people really notice it.

Fortunately, there are plenty of sound designers who are dedicated to this quest for quality, and you can hear from them in our five-page audio special that begins on page 15.

James Batchelor
james.batchelor@intentmedia.co.uk

Games industry investment swings back to the UK

Australia and Quebec developers hit by significant funding and subsidy cuts as Nordic Game Program also ends

by Craig Chapple

GAMES INDUSTRY INVESTMENT is swinging back to the UK following the introduction of games tax relief and budget cuts in other regions around the world.

According to a recent TIGA survey, the number of studios in the UK rose from 448 to 620 in 2013, up 38 per cent. And the trade body believes the newly introduced tax breaks will generate and safeguard £450m worth of investment expenditure by UK studios.

"The UK is a highly attractive place to do games business: we have skilled developers, creative studios and a stable investment environment," TIGA CEO Richard Wilson told *Develop*. "This is a great time for the UK games industry."

In contrast, in May, the Australian government cancelled its $20m Interactive Games Fund. It's been unwelcome news for local developers, including Sanatana Mishra, designer at *Assault Android Cactus* studio Witch Beam.

"It means we'll see a lot less projects being started and owned by Australians and a lot more talented developers seeking overseas opportunities," said Mishra. "The industry collapse from a few years back was only possible because we had very few Australian-owned studios and even fewer projects, I think the AIGF was doing a great job of helping us build a far more stable industry."

He added: "I would describe Australia as having a very small and very indie focused industry. It's not a bad direction, but I do worry about the extremely limited opportunities we have and how that will slow our growth."

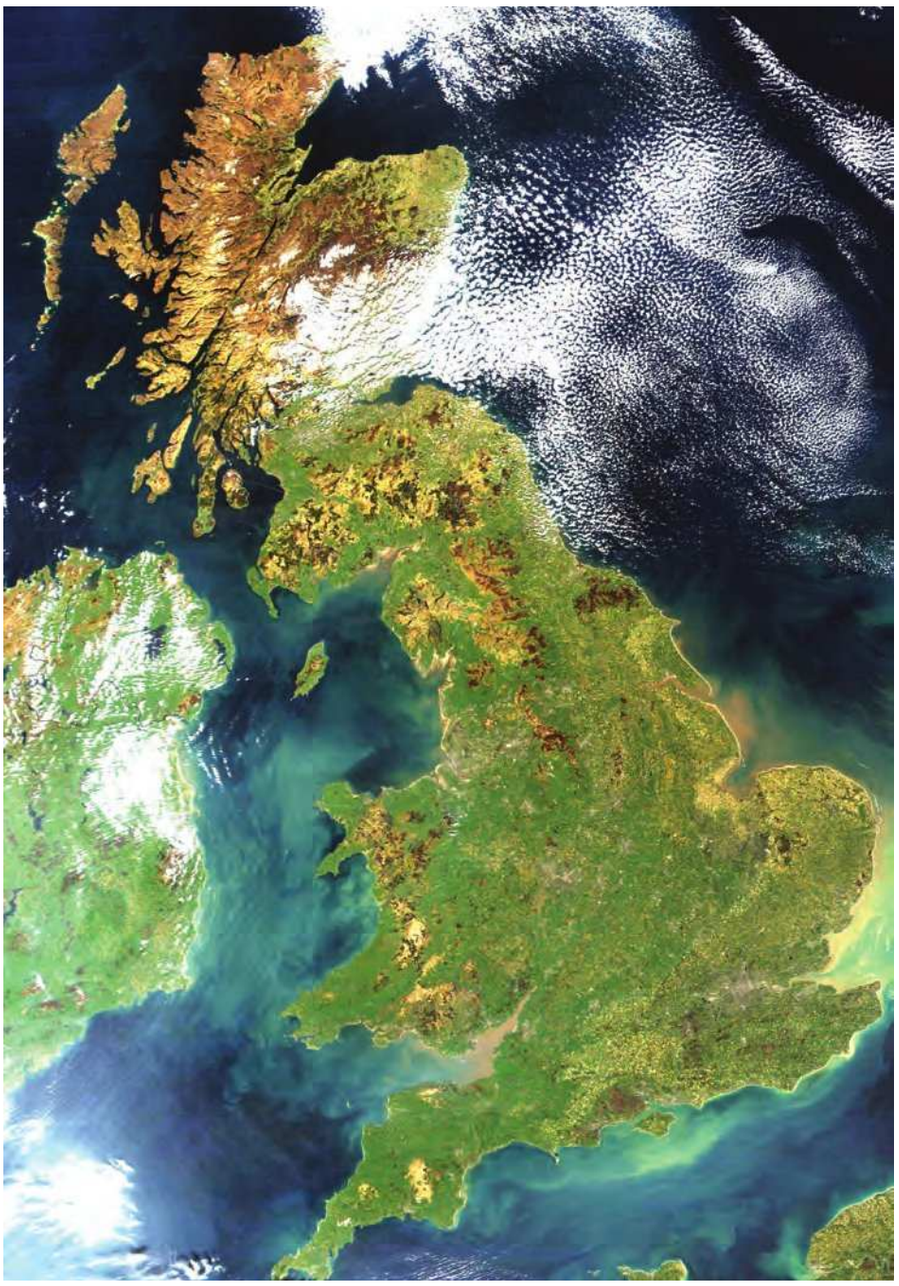
Quebec meanwhile has had its generous tax relief scheme slashed to 24 per cent for games not produced in French, and 30 per cent for those that are.

Top to bottom: Witch Beam game designer Sanatana Mishra, TIGA CEO Richard Wilson and UKIE CEO Jo Twist

However, a spokesperson for the ministry of Economy, Innovation and Exports has told *Develop* that publishers Ubisoft and WB Games Montreal will continue to enjoy tax relief of up to 37.5 per cent until at least 2019, thanks to special agreements they have signed with the Quebec government.

A review board on Quebec taxation will be set up during Autumn to "recommend adjustments to tax credits" for the upcoming budget. It has not yet been decided if this could result in a rise in incentives or further cuts for all games studios in the region.

UKIE CEO Jo Twist said that the reduction in some regions of funding and loss of tax schemes, including that of the Nordic Game Program which appears to have ended for now, has shifted the balance further towards the UK.



After much talk of a UK 'brain drain', the country's industry is once again hitting growth, with over new 150 studios in 2013

> ***"The UK has a fantastic opportunity as we roll out the new tax credit scheme."***
>
> Jo Twist,UKIE

"Once we envied Canada's level of financial support but now I can see the rest of the world looking at our growing ecosystem with great interest and the UK's games and interactive industry now has a fantastic opportunity as we roll out the new and highly innovative games production tax credit scheme," she said.

"We worked very closely with government to shape it to the needs of games companies in this country both big, small and micro.

"We made sure it was inclusive, accessible and competitive to encourage more studios to set up in the UK instead of elsewhere." ■

Dare ProtoPlay 'vital to launching dev careers'

Abertay's Louis Natanson says public exposure is the best way to validate what you're building

by James Batchelor

THE ORGANISERS BEHIND Dare to be Digital are gearing up for their annual ProtoPlay event, with one figure stressing the importance of the showcase to starting new careers in games.

Professor Louis Natanson, who leads computer games education at Abertay University, said that the public exposure student teams receive at the Dundee event is one of the most crucial aspects of the Dare process.

"Showing your game to thousands of members of the public is a daunting prospect, but there's no more immediate way of finding out if you're building something the public wants to buy than showing it to them, explaining your ideas and seeing instant feedback," he said.

"This is an experience that's important for everyone, from students aspiring to get into games right through to established professionals setting up indie studios."

Previous winners are also quick to sing the competition's praises. Liam Wong, now director of presentation at Ubisoft Montreal, told *Develop* that Dare launched his career, adding that by the time it was over he "had an award-winning game under my belt and still had another year of study ahead".

> ***"Getting feedback is an experience that's important for all developers."***
>
> Louis Natanson

Sophia George, the first games designer in residence at the V&A museum, adds: "Dare is the perfect competition to enter, regardless of what direction you want to take in the industry. It could be a demonstration of your own work to show potential employers or a great starting point if you want to form an independent studio."

Dare to be Digital is an eight-week contest for student developers that offers them industry mentoring as they attempt to build a game from scratch. It culminates with Dare ProtoPlay, which takes place in Dundee from August 7th to the 10th.

All 15 Dare games will be on display, as well as other titles, including the first preview of George's game for the V&A. ■

UKIE bringing the beach to Cologne

TRADE BODY UKIE will once again be hosting a stand for the UK games industry at next month's Gamescom in Cologne, Germany.

This year, the stand will have a 'British seaside' theme, so expect deck chairs, buckets and spades. A range of packages are available to developers on the UKIE website, with options covering exhibition and meeting spaces, as well as marketing and networking opportunities too.

UK devs that have already signed up include Team17, nDreams, Fat Pebble, Born Ready Games and Atomicom.

"The UK industry stand is primarily there to showcase UK games talent, creativity and innovation," said UKIE CEO Jo Twist.

"We attract a multitude of key industry players and business contacts to the stand and ensure they can see and meet the wealth of talent working in the UK."

UKIE will also be holding its own 'game of the show' contest, sponsored by Atomicom and with *Develop* as media partner.

"Judged by industry professionals and games development peers, the UK Game of the Show accolade is awarded to an as-yet unreleased game that truly represents the strength of the UK development scene," Twist said.

For more information on getting involved with the UK industry stand at Gamescom, email alexa@ukie.org.uk or call her on 020 7534 0598.

develop iPad

Videos are available within the iPad edition of *Develop* on iTunes and the browser-based Digital Edition, which can be accessed at develop-online.net

THIS MONTH

Check out the video demos of the latest new technology and design techniques.

See Silicon Studio's new rendering engine

P39

Procedural generation in action in *Elite: Dangerous*

P40

Ustwo's Unity-built mobile puzzler *Monument Valley*

P50

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GDC EUROPE 2014
August 11th to 13th
Cologne, Germany
www.gdceurope.com

JULY 2014

DEVELOP CONFERENCE
July 8th to 10th
Brighton, UK
www.developconference.com

DEVELOP AWARDS 2014
July 9th
Brighton, UK
www.developawards.com

QUAKECON
July 17th to 20th
Dallas, USA
www.quakecon.org

CASUAL CONNECT USA
July 22nd to 24th
San Francisco, USA
usa.casualconnect.org

AUGUST 2014

DARE PROTOPLAY
August 7th to 10th
Dundee, UK
www.daretobedigital.com

SIGGRAPH
August 10th to 14th
Vancouver, Canada
s2014.siggraph.org

GAMESCOM
August 13th to 17th
Cologne, Germany
www.gamescom-europe.com

UNITE
August 20th to 22nd
Seattle, USA
www.unity3d.com/unite

NEXT MONTH'S ISSUE

Develop #152 – August 2014

DEVELOP AWARDS 2014

We celebrate the winners of this year's highly coveted Develop Awards, plus comments from the victors and photos from the ceremony itself and drinks reception. If you aren't able to make it to the event, this will make you feel like you were really there.

THE FUTURE OF MOTION CAPTURE

The technology used to translate real movements into in-game ones is becoming more and more advanced. *Develop* looks at the latest developments in this sector, at what mo-cap companies are now able to accomplish, and at how accessible this technology is becoming for smaller and independent studios.

FACIAL ANIMATION

The new generation of consoles bring developers even closer to perfectly recreating the human face. We look at the new technology and what it offers, as well as alternate tools for other platforms such as the latest smartphones and tablets

GUIDE: MODELLING TOOLS

A round-up of the tools used to carefully craft every object and character in video games.

GUIDE TO COLOGNE

A comprehensive overview of what to expect from this year's GDC Europe, and Gamescom – plus tips on how to get the most out of your time in the beautiful city of Cologne.

COMING SOON

DEVELOP #153
SEPTEMBER 2014

- Music Special
- Narrative Design & Storyboarding
- Guide: Workflows & Pipelines
- Discoverability

DEVELOP #154
OCTOBER 2014

- Monetisation: Experts' secrets revealed
- Real Money Gaming
- Funding & Investment
- Guide: The Best Mobile Tools

For editorial enquiries, please contact James.Batchelor@intentmedia.co.uk
For advertising opportunities, contact Alex.Boucher@intentmedia.co.uk

AT A GLANCE

JULY 4TH
Brains Eden 2014
Cambridge's annual festival for digital creatives and aspiring games devs.

JULY 8TH
Develop Conference 2014
Join hundreds of industry insiders at the UK's summer dev hub.

JULY 9TH
Develop Awards 2014
We celebrate the last 12 months of games development excellence.

JULY 17TH
Dawn of the Planet of the Apes
Gary Oldman and Andy Serkis get up to some monkey business.

JULY 24TH
San Diego Comic-Con 2014
More video games mania will be on show at the SACC.

JULY 29TH
International Tiger Day
A day to enjoy the company of our exotic feline friends. Or hide.

Variable declarations

//COMMENT: BUSINESS

Extraordinary games companies: Tencent

Nick Gibson charts the rise of a firm set to be bigger than EA and Activision combined

Nick Gibson believes once Tencent turns its attentions to the West, it could lead to even the biggest publishers looking small in comparison

FOR THE LAST decade, the competition to be the largest games publisher in the world has been a two-horse race: EA versus Activision. However, following the unveiling of its 2013 financials earlier this year, a new company not only entered the competition, but effectively reduced it to a one-horse race.

Chinese media and telecoms giant Tencent has now swept past EA and Activision and is accelerating away at a rate Western publishers can only dream of.

Gaming represents the most important part of Tencent's overall business, generating $5.1bn of its $9.7bn 2013 sales. This compares to $4.6bn and $3.7bn for Activision and EA's respective 2013 calendar year sales. While both the publishers' annual sales growth has rarely exceeded 15 per cent in the last decade – and even declined in many years – Tencent's growth has been both consistent and consistently massive. It added $1.4bn in new games revenue in 2013 alone.

Explosive growth is not uncommon in such a hits-driven market as games, but few have been able to maintain it in the long run and none at this scale. Analysts forecast that Tencent will double its revenue over the next three years, likely making the firm larger than EA and Activision combined.

Tencent's games operations are diverse but centred around two technology platforms: online PC and mobile. On PC, Tencent operates a social network (QZone), instant messaging (QQ Messenger) and dedicated online games services (QQ Game Platform) that together reach high hundreds of millions of users. Its casual and core games are all monetised using free-to-play microtransaction and subscription models. Its key titles are internally developed MMOGs or Korean licenses, most largely unknown in the West like *Dungeon And Fighter* (*pictured*). *League of Legends* has been a rare but huge Western success in China, in no small part thanks to Tencent's local market guidance.

> ***"Gaming represents an important part of Tencent's business, making $5.1bn of its $9.7bn 2013 sales."***

The company's mobile games initiatives are more recent but also distributed within a range of dedicated mobile social, communication and commerce services. Most important of these are Mobile QQ (its QQ IM mobile service) and WeChat (its dedicated mobile messaging service). Crucially, Tencent also operates its own Android app store, which is now linked into its communication apps to keep games related purchases in-house.

A DIFFERENT KIND OF SCALE

Its success is built on a growth strategy that is radically different to Western games publishers. Where EA and Activision's empires are built on games franchises, Tencent's is built on platform and customer ownership. Games have simply been the most effective way to monetise and grow these platforms.

Tencent operates internationally but the vast majority of its business is in China where its overwhelming scale and China's international trade barriers ensure that it remains the publisher of choice for major Western games companies – tellingly, Tencent publishes both *FIFA* and *Call of Duty* in China. It has vast cash reserves and made judicious use of acquisitions (e.g. Riot Games) and investments (e.g. CJ Internet) to tie up content for its various platforms. Tencent has, however, also faced accusations of monopolistic practices, such as its internal development teams cloning third-party games.

Its next major area of growth is mobile gaming. Overall revenues are still small compared to its PC games sales at $290m in Q1 2014, but they were up 300 per cent over Q4 2013. Much of this is down to the integration of games into its mobile communications and commerce platforms, a process that is only just starting. WeChat is the largest mobile messaging platform in China with 396m monthly active users. Despite some government run-ins over WeChat's openness that could yield future problems, it already controls around 50 per cent of the Chinese mobile games market and its grip on what is the fastest growing corner of the global games industry is unlikely to slip.

Given its size, Tencent's Western games market initiatives have been fairly muted to date. The Riot Games acquisition was a major success but was primarily made to secure Chinese games rights. Its 48 per cent stake in Epic, bought for $330m, is clearly a long-term play. Tencent's focus will continue to remain on China for the next few years at least. When its indigenous market's growth starts to flatten, it will eventually turn its full attention to the West. By that point EA, Activision could be a distant dot in the background. ■

Nick Gibson is a director at Games Investor Consulting, which provides commercial check-ups, strategy and data to games, media and finance companies.
www.gamesinvestor.com

//COMMENT: BUSINESS

IP: The lifeblood of your business

Debbie Bestwick explains why indies must never let go of their rights

CREATIVITY, INNOVATION, EXPERTISE, technology and patents – intellectual property is at the core of business today. Owning and protecting your IP rights is a priority, whether you're a corporate giant in the city or a start-up in your bedroom.

In today's economy and global age, businesses are looking for creative ways to improve competitive advantages, attract investment and grow profits. Some companies have learned that their IP assets can play a key role in achieving these goals and have begun to explore ways to leverage and deploy them. Many more business, however, still have much to learn.

Companies that do not actively manage their IP are essentially destroying value and, worse still, businesses that relinquish their IP rights are sailing a fine line between survival and death.

> ***"Simply put, without keeping ownership it's highly unlikely Team17 would be in existence today."***

The ever-changing environment that is the games industry has seen a huge shift in the past eight years. The traditional retail market, while not dead and buried, has certainly been constricted by the arrival of digital distribution. Team17 was an early adopter of this brave new world and our pioneering spirit has recently seen it return to third-party publishing, where its attitude towards developers' intellectual properties makes up one of the central pillars of our strategy.

Our third-party ethos is to help grow and nurture independent developers with an eventual goal of seeing them achieve not only profitability but, more importantly, self-sustainability. To this end indies are actively encouraged to keep hold of their own IP – a sentiment that was recently echoed by *Thomas Was Alone* creator Mike Bithell, who tweeted: "We are the first generation of developers where giving up IP is not the normal publisher requirement. Do not waste that. Own your stuff."

IN CONTROL

As one of the world's oldest independent development studios, Team17 has learned the value of keeping its IP the hard way – twice we faced losing the *Worms* brand. Simply put, without keeping ownership it's highly unlikely Team17 would be in existence today – it's that important.

The closest Team17 came to losing its IP was in the late 1990s. The business had to recoup on a loan with an unnamed publisher. For a number of reasons, we were behind schedule by around four to five months on a big game. Extra funding was needed in order to make it through to release. Sales targets were set by the publisher, together with a clause that the *Worms* IP would be relinquished should those figures not be met. A close working relationship with the publisher's team allowed Team17 to monitor orders on a day-to-day basis, knowing every single unit sold and where it had shipped over the previous 12 months (the target had to be hit within 12 months).

At the time, the extra funding was necessary but agreeing to clauses that include IP seizure is beyond stupid. In the end, the close monitoring paid off and Team17 beat the target by 1.7 per cent.

The game went on to actually beat the numbers, but it was certainly a lesson learned. Back in 2006/2007, Team17 was struggling to find a boxed publishing partner – not because anyone wasn't interested but rather the refusal of Team17 to give up its IP. Indies need to understand the value of their IP both in the here and now and in the future. Be strong and walk away (we did).

Team17 was close to losing its Worms IP after signing a deal with a publisher to sell a specific number of units for a game, or risk giving up the rights

In our industry, intellectual property is everything. It's at the very heart of a game's creation and for an indie it's their lifeblood. Without owning of your IP, you're essentially a work-for-hire studio. Don't get me wrong, there is merit in this – just look at some super successful studios like Sumo Digital.

With your IP rights in place, you become open to opportunities and are able to tap extra revenue streams by maximising the potential of your assets. By controlling your own IP, you also control your destiny. ■

Debbie Bestwick is CEO and one of the founding members of Team17. She pioneered the company's leap into digital publishing and can be found on Twitter via **@djbteamsters**
www.team17.com

//EXTRA CONTENT ONLINE

"I believe we have to trust the player and recognise when it leaves our hands, it's their game, not ours."

Should a game's direction be led by the designer or the player?
Oscar Clark, Everyplay
http://deve1op.net/1syCScL

"A growing number of players are expecting to play a closer representation of themselves."

It's not about equality, it's about presence
Catherine Goode, Preloaded
http://deve1op.net/1oRxrBB

"All communities will challenge you every day. However, it's really important to keep that two-way flow of information going."

Building an online community
Jane Ryan, Jagex
http://deve1op.net/1oRAqtJ

To see all of our reader blogs visit: www.develop-online.net | Email craig.chapple@intentmedia.co.uk to contribute your own blog

//COMMENT: EVENTS

Supporting the next generation

Tim Hunter, director of learning and events at BAFTA, details why the Academy is backing Brains Eden

BAFTA is working with Brains Eden to help teach aspiring developers how to get into the industry

ON JULY 4TH, BAFTA contributed to the Brains Eden programme, where Mike Bithell – creator of the hugely successful, award-winning indie game *Thomas Was Alone* – shared the tricks of his trade with an eager audience of emerging game makers.

Bithell gave an account of his journey so far; starting as a traditional developer at Blitz Games Studios and Bossa Studios before finding success with *Thomas Was Alone*, a game he made in his spare time. Two years on, the game has hit a million copies sold, and won several awards. He is now working with a team to bring his second independent project, *Volume*, to completion.

Brains Eden is just one of 250 events in BAFTA's yearly programme. All of our events are open to everyone – not just BAFTA members – and focus on developing the art and craft of making film, TV and games. As with Bithell's session at Brains Eden, they are a platform for a BAFTA winner or nominee to talk about their career. Many of our events are aimed at those in the industry, but an almost equal and increasing number target the next generation of talent.

PULLING DOWN BARRIERS

For BAFTA, it's important that we support the next generation, as we believe there should be no barriers for talented people to succeed. Events like these not only share insights but help new talent to meet and network with people who can support their development. Our events help those coming into the industry to understand the creativity that goes into making an award-winning game. Our BAFTA Games Committee, comprised of elected BAFTA members, guides us in all we do in games – helping us identify those who are doing great things and keeping us up to date with the latest trends in the industry.

Five years ago, the Games Committee highlighted the issues that were to inform the Next Generation Livingstone-Hope report. BAFTA Young Game Designers was our response to that – an initiative aimed at young people with a passion for games, giving them insights into what it's like to work in games as well as the opportunity to enter a competition in which the winning ideas get made into a game. We have engaged tens of thousands of people with our workshops, competition and our web series produced in partnership with Yogscast.

> ***"It's important to support the next generation. There should be no barriers for talent to succeed."***

It was also the Games Committee who highlighted the opportunity of working with Brains Eden and who stressed the importance of supporting the games industry in Cambridge. Our partnership with Brains Eden has grown this year – Brains Eden worked with us on our indie developer networking event at The Cambridge Junction with David Braben on Tuesday, July 1st.

The Brains Eden festival invites students from all over the world to take part in an intense creative programme, taking advantage of the fantastic games industry infrastructure that thrives in Cambridge. A key part of why we are so keen to support the festival is because of the work they do to introduce the industry to the next generation of talent – something that we encourage.

Our members are not obliged to give back in this way – people are members for many reasons and many of our members are 'silent supporters', content to vote in the awards and support our mission in this way. However, we have found that many members are very keen to volunteer their time, and we make it our mission to ensure that the projects we are involved with are of a high standard – we want our members to be able to 'give back'.

The BAFTA team try to do the heavy lifting so that our members don't have to, and we are so grateful for their support. So if you were in Cambridge on Tuesday 1st or Friday 4th, thanks for joining us in celebrating the fantastic artists who are contributing to making the industry and gaming culture in the UK one of the most exciting in the world. ■

Brains Eden is made possible by the support and dedication of Creative Front Cambridgeshire, Anglia Ruskin University's initiative to stimulate, incubate, grow and further the creative industries in the Cambridge area.
www.brainseden.net

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WARWICKSHIRE

We've been making great games at our Warwickshire campus for over 25 years. Today, our HQ has evolved into a cutting edge-facility which plays home to the BAFTA Award-winning Racing Studio, the talent behind the DiRT and GRID franchises and our online community hub RaceNet. Our countryside Warwickshire campus also hosts our innovative Digital Studio and ground-breaking Central Technology team.

BIRMINGHAM

For over five years, Codemasters Birmingham has been home to the BAFTA Award-winning series of FORMULA ONE games and now hosts the talents of two teams: one crafting new FORMULA ONE experiences for consoles and the other creating mobile games. Whichever team you choose, you'll find colleagues who pride themselves on doing great things in a supportive and innovative environment. Codemasters Birmingham offers a friendly working culture in an open-plan, fully refurbished 6th floor office overlooking the city's entertainment district.

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BETA

DEVELOPMENT FEATURES, INTERVIEWS, ESSAYS & MORE

THE REBIRTH OF MIDI: Audiokinetic looks at how the technique is making a comeback
P20

DIRECTING IN GAMES A look at the new opportunities opening up for directors
P24

DEVELOP CONFERENCE GUIDE: Don't miss a thing with our pick of the top sessions and keynotes
P28

Aural nirvana

As games become more ambitious and look for new ways to immerse players, **Craig Chapple** analyses the latest tools and techniques open to sound designers

Total War: Rome II marked the first time Creative Assembly adopted wwise, offering sound designers a visual GUI to take the workload off the coders

GAME AUDIO HAS come a long way since the early days of *Super Mario*, where much of the same music was condensed to provide extra sound effects.

Enormous musical scores are now provided on the scale of film, and sound is fast becoming a near central part of all gaming.

Take our Develop Awards finalists. Simogo's text-based adventure title *Device 6* heavily relies on its immersive audio to engage the player with the story and ratchet up the tension during key parts of the narrative.

> ***"I can't for my life understand people that say they play games with the sound turned off."***
>
> Simon Flesser, Simogo

And the bigger titles like *Battlefield 4* and *Total War: Rome II* rely on realistic sound effects to make the player actually feel like they're in a warzone, and not just playing a game.

"To me sound is as an important factor for feedback as anything visual," says Simogo founder Simon Flesser.

"I can't for my life understand people that say they play games with sound turned off. To me, that'd be just as absurd as turning off the screen and playing with sound only."

Another Develop Awards finalist, audio veteran and the man behind *Monument Valley*'s sounds, Stafford Bawler sums up the importance of such effects by offering an example from a large scale project he'd previously worked on.

"I'd just delivered the first proper audio build to the game, replacing all the early tests/placeholder with first pass final audio that represented where the game was going in terms of audio," he reminisces. "On hearing this for the first time the game's lead designer was speaking with the audio coder and said 'It feels like a proper game now, we're no longer just making builds'."

SHARPENING SOUNDS

New hardware for both mobile and console, as well as a number of constantly refreshed audio technologies such as FMOD and wwise – which recently opened up new and free indie licences – are also helping studios record and implement new styles of audio.

"In previous generations, a limited set of additional tools was available, and it was more restrictive to set up multiple instances

Top to bottom: Creative Assembly's Matt McCamley and Richard Beddow, Simogo's Simon Flesser and sound designer Stafford Bawler

Main: Alien: Isolation uses audio to conjure up dark and scary imagery and tap into the player's subconcious to amplify the tension

Below right: Simogo's Device 6 picks particular moments when to play sound, so as to expand on the reading experience but not shatter the immersion of the reader

due to technological shackles," says Creative Assembly and *Total War* senior audio designer Matt McCamley. "As games tech matures, so does in-game audio, chiefly in the way we can deliver an experience to the player."

One of Creative Assembly's hotly anticipated titles, *Alien: Isolation*, is a prime example of how key audio can be in games. The team has had to adopt various new and unique techniques to evoke the original film's haunting atmosphere and turn it up to ten to keep players on the edge of their seats for its 15-hour or so duration.

And from early footage, the game just wouldn't be the same without sound. The team's sound designer Sam Cooper says the game's audio has been crafted to subtly conjure up dark and scary imagery on even seemingly mundane objects, tapping into the player's subconscious, in-built fight-or flight responses. He explains this creates an unpredictable soundscape that will keep users second-guessing what their ears are telling them, moving the experience beyond just twitch-play and how good they are at games.

And much of this has been made possible thanks to new consoles and tools.

"With additional processing power and frequently updated middleware, we're now able to use rich convolution reverbs on new-gen consoles and experiment with emerging DSP such as in-game HRTF/binaural processing," says Cooper. "We're far less limited by the hardware with new consoles."

Another CA sound designer, *Total War* audio manager Richard Beddow, says *Rome II* marked the first time the studio had used audio engine wwise, as it offered tools for sound designers in terms of how to play back assets assigned to game events, asset containers and shared resources such as DSP settings. This meant that designers could set up new items, previously the realm of coders, thanks to its visual GUI, creating what Beddow says was a more efficient workflow.

Bawler recommends other tools, such as Unity and Fabric, which he says lent themselves to the way he likes to work, creating ordered hierarchies and the careful management of data trees, allowing him to spend more time on the creative elements of audio creation.

MOBILE BEATS

Much like Creative Assembly is experimenting with sound implementations in its big budget console and PC outings, mobile is also home to some interesting techniques.

Simogo's Flesser had the tough task of integrating audio, along with composer Daniel Olsén, in interactive story *Device 6*. The audio had to match the reader's interpretation, while also not losing their attention by playing sounds at the wrong time.

"We wanted to keep a lot of the things up to the players' imagination, so it was a tough balance to decide what things that are mentioned in the text should be audible or not," he explains.

"Creating a sense of space was our biggest priority. So working with footsteps to

communicate different materials, the right amount of reverb on sounds to communicate size of rooms, mixing things properly, fiddling a lot with EQ on every sound to make everything feel just right within the space that the player was in at the moment."

AUDIO CONSTRAINTS

Time and budget constraints can of course play a big role in the quality of audio and its variety, particularly if designers are required to go to the source, but mobile in particular throws up a unique set of challenges.

The major limitations presented by smartphones, Bawler says, is the speakers themselves, which often use mono and face away from the listener or are placed just under the player's hands.

"The Nintendo 3DS has amazing HRTF playback going on with its speakers. It would be awesome if more phones featured this kind of thing," he states.

"You also have to deal with the fact games on mobile are played all over the place, often crowded or noisy environments, or places where you don't want to annoy other people. When I was traveling on the tube in London whilst working on *Monument Valley*, there were about ten people in the carriage all playing their phones. On the one hand I thought it was a shame they were all silent, but I was also thankful that we didn't have an amusement arcade cacophony going on."

Flesser adds that getting people to play mobile games with the sound turned on is actually one of the biggest challenges for developers, and suggested stating the requirement early on if it's central to the experience. He also says designers need to make sure audio can run on older devices, which can limit effects on newew mobiles despite their more advanced capabilities.

"For some reason or another, people tend to play mobile games without sound, and quite a few puzzles in *Device 6* requires the player to listen to audial clues," he says.

"We used low pass filters here and there, and we actually had to turn that off on older devices because it was too demanding and we want to keep a steady framerate and performance to keep the experience smooth."

IN THE FIELD

While many games keep to a small size, it could be argued many more are becoming bigger and more ambitious, particularly at the top end. As such, the use of field-recording is becoming more widely used and new libraries are being created as the old sounds from past games become overused.

> ***"Recording your own material or investing in boutique libraries constructed for games is a must."***
> Stafford Bawler, sound designer

Bawler suggests sound designers now need to up their game if they're to create the soundscapes consumers clamour for.

"Going out and recording your own material or investing in boutique libraries specially constructed for games is a must," he states. "The older libraries have been our bread and butter for years, but they were all recorded for TV, film, radio etcetera – a linear environment where you're making a 'photograph' of sound rather than the dynamic, living, breathing soundscapes we have to create for games."

Beddow says the audio process isn't necessarily becoming significantly more difficult as games get bigger, but says such scale has sparked a greater management challenge of the process.

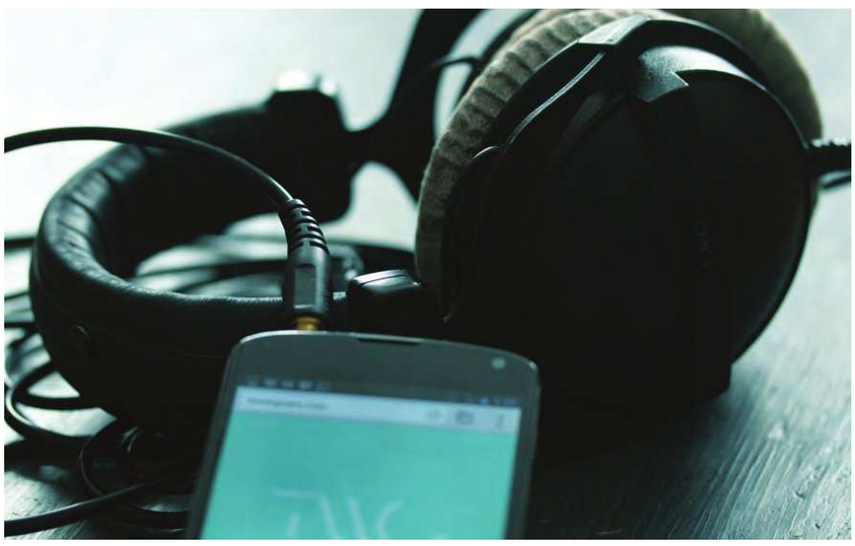
"You have to be smart," he says. "Largely it's about the best way to manage the asset-volume and deploy the right resources, both internal and external, to deliver the kind of deeply immersive, cinema-grade soundscape that the modern player, quite rightly, has come to expect."

Looking forward, many more techniques, both old and new, could become more central to the audio process, such as binaural audio in virtual reality games [See boxout Virtual hearing], for example.

Bawler says he's excited by the prospect of working with procedural audio in future, particularly given the prominence of various uses of the procedural generation technique evident in the industry at the moment [See page 40 for more details].

"Since very early days, my way of working has been built upon building complex sounds and audio systems from simple components combined in interesting ways," says Bawler.

"Procedural audio seems like a natural fit for this way of working, and from what I can tell, you still need a sound designer to make sure it's all sounding as it should." ■



One of the challenges of mobile audio (below left), is the need to support older models, meaning developers may have to forgo the latest advancements in tech

VIRTUAL HEARING

ONE TECHNIQUE BEING championed for virtual reality gaming is binaural audio. The effect simulates the way people hear, allowing them to determine the location of sounds in the environment to their near precise place in the game.

One firm, Scotland-based Two Big Ears, has developed a real-time binaural engine called 3Dception, a Unity plug-in that can currently be used for Windows, OSX, Linux, Android and iOS, with support for other development environments also on the way.

Co-founder and director Varun Nair (*pictured*) says the technique can be used to create a believable experience, by taking in factors such as how the brain interprets the location of sound.

"Virtual reality devices like the Oculus Rift or Project Morpheus, with head and positional tracking, are fantastic at creating believable and immersive visual worlds," he says.

"The difference between stereo audio and binaural audio is just as different as playing a game on a computer screen and through a pair of VR goggles. The VR experience puts you at the centre of action and binaural audio helps strengthen that belief. Traditional stereo sound comparatively sounds a bit flat. If I see something flying over me, I'd like to hear it fly over me too. Most VR experiences are personal and binaural audio is a perfect fit."

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Sound in Transit

Supergiant Games' Transistor sounded as beautiful as it looked. **Will Freeman** speaks to the title's audio director Darren Korb to learn how a small team delivered such a high audio standard with the studio's latest release

A GREAT DEAL is distinct about the critically lauded action-RPG *Transistor*. It's idiosyncratic spin on its genre's conventions and sharp visual style in particular attracted high-praise.

But *Transistor*'s crisp, atmospheric audio also enjoyed a wealth of positive attention: a particular achievement in a world where even the best game sound design can be ignored by the mainstream press.

Ultimately, the title's aural elements succeeded on several levels. They served to cement the style and atmosphere crafted by Supergiant's design team, responded deftly to the gameplay, and in the case of the PS4 release, established the controller as something rooted firmly in the title's peculiar universe. And serving as the beating heart of *Transistor*'s auditory substance was Firelight Technologies' FMOD Studio, the audio content creation tool inspired in part by established digital audio workstations.

A MATTER OF PRINCIPLES

For the development team, their success with sound was founded on a fairly simple principle of game design.

"A main consideration from our point of view with any game is using audio to deepen the immersion and reinforce the atmosphere and tone of the game as best we can," explains Darren Korb, audio director at Supergiant Games, who also worked on the studio's previous title, *Bastion*.

"We spent a lot of time prototyping the art and audio to make sure that they were 'of a piece' this time. That was one of our goals. *Bastion*, I thought, turned out really nicely, but a goal on this project was to more seamlessly integrate the look and feel of the art with the feel of the audio."

Spend even a short time with *Transistor*, and it's clear Korb and his colleagues succeeded in that regard. Part of their secret, it turns out, was in having team members of every discipline contribute to the sound design. As well as Korb, the game's programmer Chris Jurney and designer, writer and creative director Greg Kasavin both became involved in the audio effort, with FMOD Studio's accessible form making it a welcoming tool for those who come from different disciplines.

"I feel great about how the audio turned out in *Transistor*, and with a team of our size I was also the composer and the sound designer," states Korb. "FMOD Studio – especially considering how feature rich and powerful it is – it seemed pretty easy to use, and the FMOD guys were pretty responsive if we had a bug report or feature idea."

> ***"We were able to do complex mixing stuff that would have been daunting to try with different software."***
>
> Darren Korb, Supergiant Games

Of all of *Transistor*'s audio achievements, perhaps the most significant is the aforementioned skillfulness with which the game to responds to player action, with music building from the non-percussive through to elaborate, vocally supported tracks in combat. And according to Korb, FMOD Studio did much to make that task easier for the small team at the reigns.

"What was really nice about working with FMOD Studio was being able to implement all of the music as multi-track stems," he offers. "What that allowed us to do was have really specific control over each stem individually, so we could turn them on and off at will, and give each stem different effects if we wanted to.

"That was actually – once we got going with it – fairly easy to set-up," Korb continues. "That was really useful to us. We were also able to do a lot of complex mixing stuff that would have been really daunting to try with a different software."

TAKING CONTROL

Similarly, Supergiant have achieved remarkable things in harnessing the PlayStation 4 controller as a conduit for *Transistor*'s audio atmosphere, going beyond simply taking advantage of the gamepad's built-in speaker.

"We were able to take advantage of two main controller features with our audio," confirms Korb.

"What we did was, on FMOD Studio's mixer channel – so basically the bus that had the voice over on it – we were able to run that through a volume-metering tool and translate that into a flashing light on the controller. We could make the gamepad's lightbar flash in sync with the voiceover, as the sword in the game did the same on screen, so the three would work together to help make the player feel they were actually holding the *Transistor*.

"Then the controller speaker just seemed a pretty obvious thing to at least have as an option for players."

That's just scraping the surface of *Transistor*'s audio achievement, but it does demonstrate what a small team can do with FMOD Studio, even if that team isn't universally experienced in audio work.

Supergiant's next creation is presently a matter of speculation, but based on its success with *Transistor* and *Bastion*, it is safe to say it will sound fantastic. ■

www.fmod.com

Supergiant audio director Darren Korb (above) says the team spent a lot of time prototyping the art and audio of Transistor (main) to ensure the visual atmosphere carried over to the music and sounds

Rebirth of MIDI

Audiokinetic's **Bernard Rodrigue** discusses how this old audio technique is set to make a comeback in games

Audiokinetic's Bernard Rodrigue believes the next level of interactivity is achieveable by separating musical notes from the instrument, which is what MIDI is all about

IF YOU HAVE been playing games for long enough, you remember how the early consoles made sounds and music through the use of on-board synthesizer chips. Some systems, such as the NES, did have PCM playback support, but due to limited memory space and other technical considerations, it was virtually impossible to use for music.

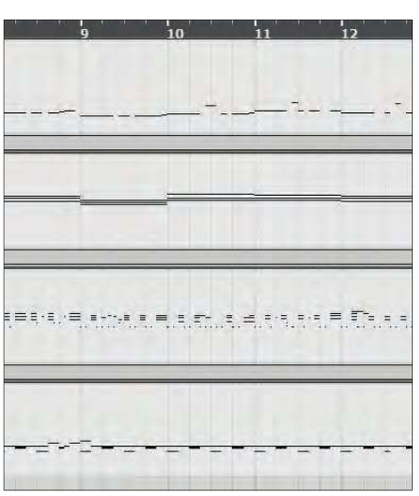
In the last 20 years, most games have been using high quality music by mixing live recordings and rendered virtual instruments from DAWs (digital audio workstations).

DAWs are rich in all sorts of features and they use MIDI, a 30-year old protocol, to store and transport musical performances. Curiously, in the game space, MIDI is almost totally missing in today's titles.

DEFINING QUALITY

Although MIDI is essentially a transport protocol, it still carries a legacy of cheap sounding music that is not only the perception of the general public, but also among audio professionals. But, if MIDI sequenced music sounds cheesy, it's generally the quality of the virtual instruments used that is to blame.

Technology has developed over the years, and in combination with content and the expertise of developers, high quality instruments are now possible. For a long time, this level of quality was only achievable offline within DAWs, but with the latest generation of platforms, it is now accessible for games.



Common interactive music scores today use a combination of switching, sequencing, layering and randomising techniques. Awesome music has been created this way, but it remains somewhat stiff, as the music is still pre-rendered. The next level of interactivity and variability is achievable by separating the musical notes (the performance) from the instrument. And that's what MIDI is all about.

Using music notes to drive instruments extends the musical vocabulary in a way that will enhance the game experience. For example, the music's tempo can be driven by game variables, in subtle or obvious ways to influence the player's actions. You certainly remember the last 100 seconds of a *Super Mario* level where the music speed would accelerate to heighten the sense of urgency.

Music transitions are also approached differently with MIDI compared with audio-based music. No cross-fade or stitching is necessary. Instead, the music transitions naturally from the last played note of the source music to the next note in the destination music. Special logic is employed to determine how to kill or keep sustained notes and how to manage notes started before the sync point at destination.

From a high level perspective, using pre-defined note sequences are simply a first step in this field. Designing algorithms to generate music notes can introduce infinite variations without adding significant efforts.

This is referred to as algorithmic composition or generative music. Mathematical, grammar, knowledge-based or evolutionary models are interesting fields of research to compose music on the fly, and games is an ideal medium for it.

Detaching the music notes from the instrumentation also allows dynamic modifications of the instrument characteristics during playback. Attaching instruments ADSR segments to game variables or morphing instruments at runtime are a few examples of what can be done when the performance is separated from the instruments.

TARGET PERFORMANCE

In the last generation of consoles, the memory and CPU resources have increased significantly, but the streaming capabilities didn't follow the same curve. This scenario is not likely to change anytime soon and is another good reason to shift the way that games play music.

Most MIDI instruments are made from samples, by synthesis, or a combination of the two. Synthesis utilises the processor while eliminating streaming in most cases. Sample-based instruments can use in-memory samples, while keeping the CPU usage low. Both models add real-time characteristics to instruments, including LFOs, envelopes, filters and effects, creating a rich musical environment.

WELCOME BACK MIDI

MIDI is ready for a comeback in games and we'll support composers and game developers with tools for using MIDI in interactive music scores.

Can games benefit from MIDI? Certainly. Can MIDI completely replace pre-rendered music? Certainly not as the game contextually dictates which approach will yield better results; it is for the team to identify them and use the right tools for the job. ■

Bernard Rodrigue is director of development at Audiokinetic. He joined the company in 2005 and actively participated in developing the foundations of Wwise and lead projects such as Interactive Music.

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Redefining Alpha
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ID@Xbox: State of the Union
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Direct action

A new wave of traditional directors from film, television and theatre are taking an interest in working in games. **Will Freeman** talks to some that have already made the transition about the challenges and opportunities

OMUK's Mark Estdale and directors Delyth Thomas and John Dower are championing the increasing use of directing games to their peers

THE TITLE 'DIRECTOR' has appeared on business cards throughout the games development sector for many years.

Those that sport the 'creative director' role are likely the term's most common adopters, but what of the role of the traditional director from the realms of theatre, film and television?

Arguably the art of direction has been relevant in the industry for years, with acting, motion capture performance, voice work and cutscenes standing as long-established tenants of the video game form. But those that specialise in traditional performance direction for games are few and far between.

That is beginning to change, however, as directors from other fields take an interest in the potential and challenge of games.

John Dower made the move ahead of most. A former director of television shows including the UK's iconic *Eastenders*, *The Bill* and *Casualty*, he joined Lionhead in 2007, fascinated by the opportunity.

"I think directors should approach games 'because they are there'," confirms Dower, now a freelance director with a long list of game projects to his name. "I don't think it's sensible today for a director to say 'I just like film', 'I just like telly' or 'theatre is the pure art'.

"Games are bigger than all that now, so I think it would be snobby for a director not to take a game seriously. That's not to say I think all games are great or that their direction can't be much better, because it can. But I don't want to get left behind as directing changes, and I don't think other directors should either."

Dower certainly isn't alone, and fellow UK Board of Directors member Delyth Thomas is endeavouring to introduce more peers to the world of games.

"Games are in that fascinating place where they're not live action or just animation, which I've often worked with before," explains the BAFTA-nominated Thomas, whose showreel is packed with an impressive range of comedy and children's film and TV work. "So often in games these actors are working without visuals – or without many visuals – and they tend to over compensate for that fact.

"So there's a challenge there as a director of having the visuals in your head and bringing the performances to match that vision and the gameplay. It's a fascinating challenge, and so should be really appealing for some directors."

That challenge may be exciting and motivating, but it's certainly not insignificant, as games makers and directors have to match their contrasting experience sets for the good of games, learning one another's creative language and methods, and melding the two. Put simply, the coupling presents a meeting of those with a long heritage in linear scripts and direction of straightforward performances with the makers of interactive worlds, which are defined by something quite ghastly to a traditional director.

THE PLAYER DIRECTOR

The player, after all, can control camera, pace, narrative order and much else beside, like some unruly audience member of a theatre production stepping forward as a creative backseat driver.

Dower breaks it down into two schools of directing; the linear, and what he calls 'interactive directing', which is at the crux of what developers must be prepared to support if they are to reap the rewards of welcoming those from film, TV and theatre to their studios.

A specialist in that very skill is Mark Estdale, MD of game dialogue production studio OMUK, and a professional devotee to stage sound and lighting since the early 1980s.

"I think directors that ignore this opportunity are as daft as brushes, really, as it's the most exciting opportunity for directors on the planet," says Estdale, who is currently at work on Telltale's coming *Game of Thrones*

Telltale is developing a game adaptation of hit television and book series Game of Thrones (below), which will be directed by OMUK's Mark Estdale

title, collaborating with US game directors Darragh O'Farrell and Julian Kwasneski.

"Directing the interactive is fucking awesome. And the skill there? It's about working around players having choice, and delivering that illusion; the illusion of choice in a game world."

That illusion of choice is a point of much academic musing; as games become more dynamic and interaction seeps into their every fibre, how much control the developer has is open to much debate – a topic explored with grace and humour in indie hit *The Stanley Parable*. But ultimately, a studio in almost every case sets the boundaries of their game, and conducts the player experience.

"That's why the illusion of choice is the craft of directing the interactive," interjects Thomas, as discussion turns to games with branching narratives, and making each player choice feel equally an act of interactive freedom and a carefully controlled vision. "It's about giving the player that illusion of choice, and that they are in total control. That's the skill. The illusion of choice is like the magic of cinema; it's about giving the player the sense that they are free to choose, to do as they want, and are unrestricted in the game world, even if it is quite different in reality."

As games become more ambitious and narrative driven, more and more directors from film and TV are taking charge of telling the game's story, often performed through motion capture (above)

GETTING PRACTICAL

To a certain extent, then, the role of a traditional director in contemporary games seems clear-cut. That role, though, is just the beginning. Making it work practically is another matter altogether.

In film, TV, and theatre, there is a clear guide to that process; a path all can agree on, be they director, actor or set designer.

"It is the scripts," says Thomas. "The script is the bible. And that's what I thought when I started to work with games. And then you see what a game script is."

To the untrained eye – and often the trained eye – a game script appears to be a mess. It can be vast, disjointed and bewildering.

"You have to approach scripts differently for games. For a director of a game, context of a script is everything," states Estdale. "There are some developers that are really great in that regard. They have a very strong vision, and a micro-level understanding of their game that they can communicate to a director really well. They join you in the recording studio, and they know what they want.

"But oftentimes you just get thrown a script and told 'record this', which just leaves a director with their experience of the conventions of the genre. To really direct a performance, you need more. And I feel sometimes the writing of the game, however good, is also often done without that context."

That is why, says Estdale, that same mantra that applies to so many other elements of contemporary games development is relevant to direction.

Quite simply, the sooner a director steps on board, the more of that cherished context they can apply to a game's world, which they can then communicate to actors, be it in the voice over booth or on the motion capture stage. A good two years ahead of release is best, so says the consensus, with directors made aware of lighting, environments, pacing and everything else that has existed since the dawn of theatre direction.

Traditional directors also have another challenge, according to Estdale, Dower and Thomas, and it's a somewhat delicate matter.

THE END OF EGO

For those that reign supreme in the television studio, film set and stage are the undisputed rulers of their respective kingdoms, and used to having the last word. They are, points out Dower, specifically trained to be project leaders and primary creatives; something they may have to unlearn in the game studio.

> ***"The illusion of choice is like the magic of cinema; it's about giving the player the sense that they are free."***
>
> Delyth Thomas, director

"It's really important for directors to talk to everyone working on a game; designers, animators, even the testers," he says. "If you don't, you're a fool. That's especially true for cutscenes, where an arrogant director could really have things backfire on them."

But according to Thomas, that is already changing over in the world where she honed her craft, as visual effects – and sometimes interactive content – continue their advance into television shows and movies.

"In a world of digital and special effects, directors have to leave their egos at the door," she says. "That's a good lesson for working in video games."

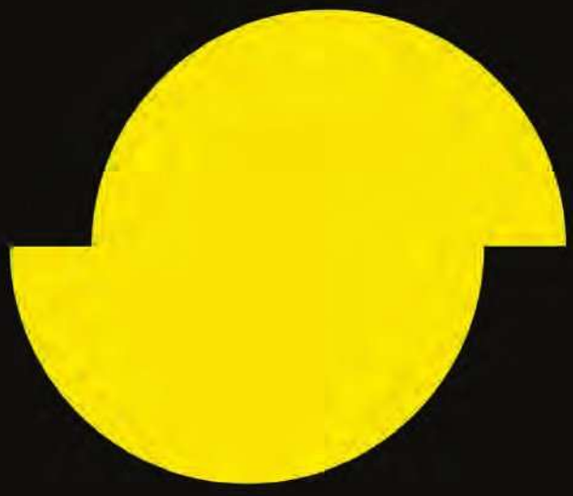
It seems clear that the work is there for directors, and progress is being made with how to best apply and make use of the skillset. But there's also the matter of structuring the working relationship.

RELATIONSHIP BUILDING

For now, a director's relationship with a given game project is often through a temporary contract. Arguably, those contracts need general adapting to better serve the needs of a director, but what of the potential for the on-staff director in a permanent position at a game studio? Estdale isn't so sure.

"We're starting to see some studios employ a permanent director on staff, but I feel it could be stifling," he suggests. "I love the variety of serving so many different games as a director. And as much as you want to get involved in a creative process nice and early, you don't want to become too entrenched."

Some things, it seems, directors want to stick to. But they are certainly interested in working in games, and have much to bring with them. They can prevent cutscene from being too much like inelegant pastiches of cinema, help a voice actor contextualise a world, better choreograph and tune the performances, cast the right talent, and lend an expertise numerous decades in the making. ■



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All things **Brighton beautiful**

08-10 JULY 2014 develop in brighton
insight • inspiration • networking

The Develop Conference returns to Britain's south coast on Tuesday, July 8th, and we've prepared the ultimate guide to ensure you don't miss anything

Dates: July 8th – 10th
Location: Hilton Brighton Metropole, Kings Road, Brighton
Website: www.developconference.com

What's new in 2014?
- *Teardown sessions: multiple talks dissecting a single release, in this case Rare's Kinect Sports Rivals for Xbox One*
- *Develop Game Jam: A 48-hour challenge to create a brand new game from scratch*
- *Indie Dev Bootcamp: A half day of free sessions aimed at indie start-ups and aspiring developers*
- *Revamped mobile app*
- *New Marketing track, advising studios on the best ways to sell their games*

Studios head to Brighton from all over the world for the annual Develop Conference, and 2014 will be no exception

KEYNOTES

The highlight of any conference is the keynote session – and Develop in Brighton has four. Check out the speakers that will be kicking things off each day, ranging from high-profile platform holder execs with decades of experience to leading independents that are changing development

TUESDAY, JULY 8TH

A Rough Guide to Cloud Gaming

9.30am – 10.15am, Room 4

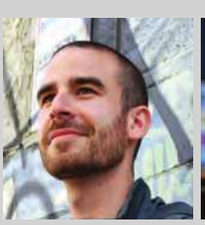
Tuesday's Evolve Conference, which focuses on new markets, platforms and technologies, starts with a talk by Microsoft's CTO for cloud services Rob Fraser (*pictured*), as he discusses how new use cases for cloud computing could make the tech an essential part of every game.

WEDNESDAY, JULY 9TH

20 Years of PlayStation, 40 Years of Console Games and 100 Years to Come

9.30am – 10.30am, Room 2

Kicking off the Develop Conference, SCE president Andrew House (*above left*) and PS4 lead architect Mark Cerny (*above right*) reflect on the history of PlayStation so far and how the platform holder is preparing for the next century.



THURSDAY, JULY 10TH

Growing Together: Being an Independent Studio in 2014

10am – 11am, Room 2

This year's indie conference begins with Capybara Games' co-founder and president Nathan Vella (*above left*) discussing the trials his own studio went through, as well as the big opportunities open to independent developers that grow their teams effectively.

Audio Keynote

5pm – 6pm, Room 5

The keynote for this year's Audio track will see SCEE's Garry Taylor (*above right*) explore his experiences with sound, music and dialogue in video games, as well as examining the key ingredients that will take the medium forward.

THE APP

This year, Tandem Events has revamped the official conference app. Available as a free download on iOS and Android, or via the web on Windows and Blackberry, it includes the complete three-day schedule and the ability to create your own timetable of sessions and networking events.

The app has even been transformed into something a lot more game-like, where users earn points by completing certain actions. Those with the most points by the end of the week will receive mystery prizes.

Other features include a map of the venue and expo, Twitter-like activity and photo feeds, and the ability to leave feedback after each session.

iOS and Android users can find it by searching for "Develop in Brighton" on their app store. Windows, Blackberry and laptop users should visit **ddut.ch/developconference-web**

DEVELOP AWARDS 2014

develop
INDUSTRY EXCELLENCE AWARDS 2014

The Develop Industry Excellence Awards will once again be held at the Hilton Brighton Metropole on Wednesday, July 9th, recognising the biggest innovators in all aspects of games development.

An impressive 136 companies have been shortlisted this year, including over 68 developers representing 14 different European nations. And that's not counting the hundreds of other companies that will be in the room on the night.

The finalists will be fighting over 24 awards, with new prizes including Musical Composition, Talent Investment, QA & Localisation, Studio of the Year, plus the newly-split duo of Tools awards.

PS4 lead architect and conference keynote speaker Mark Cerny is the winner of this year's Development Legend award. **www.developawards.com.**

THE EXPO

The Develop Expo runs alongside the conference from Wednesday, July 9th to Thursday, July 10th.

Free to all visitors, this brings some of Europe's most innovative tools and tech firms to showcase their wares – Sony is even bringing demo units of Project Morpheus. Meanwhile, the Indie Showcase, sponsored by Unity, shines the spotlight on the most promising independent projects.

Finally, the Develop Networking Bar and Lounge, sponsored by Unreal Technologies, is ideal for anyone in need of a quick refreshment or a good rendezvous point.

This year's exhibitors include:
Cadline, Cloudant, Edge, Epic Games, Gamblit Gambling, Gamesparks, IncrediBuild, Kingston University, Mixamo, Perforce Software, Sony Computer Entertainment Europe, Sprung Studios, Synertial, Unity, University of West of England, Vicon, Warwickshire County Council, Wellcome Trust, Yume

AFTER HOURS

There's more to the Develop Conference than keynotes, panel sessions and learning more about development; there is also a wide range of networking opportunities that could help establish new contacts or just make the week that much more enjoyable. These include:

TUESDAY, JULY 8TH
6pm: Ice Breaker Welcome Drinks
Waterhouse bar, Hilton Brighton Metropole

8pm: GamesAid Charity Poker Tournament
Grosvenor Casino on Brighton seafront

WEDNESDAY, JULY 9TH
5pm: Develop Expo Booth Crawl
Expo Hall, Hilton Brighton Metropole

7pm: Develop Industry Excellence Awards 2014
Oxford Suite, Hilton Brighton Metropole

THURSDAY, JULY 10TH
6pm: Close of Conference Beers
Hilton Brighton Metropole

DEVELOP'S PICKS

There are hundreds of sessions due to take place over the three days, but we've scoured the schedule for some of the most interesting. Here's six of the best:

TUESDAY, JULY 8TH

Designing For Virtual Reality
11.15am – 12pm, Room 6
nDreams' Patrick O'Luanaigh discusses the challenges of creating VR games, from controls and GUI to reducing motion sickness.

ID@Xbox: State of the Union
4pm – 4.45pm, Room 4
Xbox's Chris Charla looks back at the milestones in the first year of the self-publishing program and discusses some of the new tools available

WEDNESDAY, JULY 9TH

Bringing Substance and Deeper Experiences to Casual Gamers
11am – 11.45am, Room 2
Legendary developer Peter Molyneux and fellow 22cans dev Jack Attridge discuss how the lack of deep mechanics in casual titles inspired *Godus*, a game they hope will change everything for casual gamers.

Indie Spirit, Under Control
12am – 12.45am, Room 2
Siobhan Reddy of Media Molecule and Bossa's Roberta Lucca ponder how established studios stay relevant and how small developers grow without losing that indescribable 'indie' quality.

I Will Survive
4pm – 4.45pm
UKIE's Jo Twist, MakieLab's Alice Taylor, Three Fields' Fiona Sperry, ex-Remode boss Ella Romanos and Lady Shotgun founder Anna Marsh sing to Gloria Gaynor. Then they'll discuss the strategies that help small business survive in the UK games market.

THURSDAY, JULY 10TH

Indie to Major and Back Again: Lessons Learned Along the Way
12.15pm – 13.00pm, Room 1
Dlala Studios' co-founder Aj Grand-Scrutton reflects on his journey from being an indie in his mum's garage to incubation at Microsoft Game Studios and then back to garages, albeit with a bigger team.

Triple-A Audio Attitude for Tablet and Mobile
2pm – 2.45pm, Room 5
John Broomhall is joined by audio whizzes from Studio Gobo, Mind Candy, Codemasters and more to share how 'console' approaches can be used to raise the bar for sound in games on smart devices.

CALL FOR SPEAKERS

Send your talk proposals to **developlive@intentmedia.co.uk** by **July 31st**

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#DEVELOPJOBS

Your monthly guide to the best career opportunities in games development worldwide

MOVERS AND SHAKERS:
New hires for Dovetail, Sports Interactive and West London Games
P32

RECRUITER HOT SEAT:
Philip Oliver opens up on his new studio Radiant Worlds
P33

GET THAT JOB:
Remedy's Eva Kovalainen offers advice on becoming a character artist
P34

Scaling up an indie studio

Freejam started as a small five-man team, but with a string of new hires, the growing developer tells us how its coping with a bigger headcount

by Craig Chapple

FREEJAM IS A new UK studio formed by five developers from studios such as Climax, all working on free-to-play multiplayer PC game *Robocraft*.

The title has now surpassed 400,000 players, and as a result the young studio has brought in eight new team members as they scale up their operations, with four new developers and four language students from a local university joining.

Moving from a small indie team focused on making their dream game to running a full studio is a big change for anyone, and Freejam game director Mark Simmons says expanding with such limited resources can be tough, particularly against bigger companies.

"As a small indie we can't offer the things that some people – particularly older and more experience staff – want and need; there's no security, enormous salaries, pension, healthcare or overtime," says Simmons.

"We've had to sell what makes working for an indie like Freejam great, i.e. no publishers, no crazy executive producers, no marketing department releasing out of date screenshots or putting a dodgy image on the front of your box; fans, lots of them, telling you how great you game is.

"The new guys love working hard on a feature one week, and then seeing the users talking about it the next."

Simmons says Freejam has adopted the 'lean start-up' methodology – developing and iterating on a game and releasing it to users early on.

> ***"The biggest difference is we spend more time thinking about marketing."***
>
> Mark Simmons, Freejam

He claims building the studio this way has allowed it to prove their concept works and can keep users engaged.

"Having got to that point we've eliminated a lot of the risk that we faced at the beginning and we've been able to combine that with a steady flow of revenue that is now covering our costs, which allows us to push on and go for a bit more scale," he says.

Despite more than doubling the number of staff, Simmons adds things still feel the same for the team, but identifies one key difference as their debut game grows.

"The biggest difference is that we spend more time thinking about PR and marketing, which is totally alien to us as we're devs, so we wish that all that marketing stuff would just happen – but it doesn't," he states.

In fact, marketing is behind its four new hires of language students from a local university. The new members were brought in due to the lack of money to spend on marketing.

As a result, says Simmons, they have tried bringing in experts in foreign languages, who speak Russian, Japanese, Mandarin, Spanish, French and more, to try and attract further interest overseas in *Robocraft* through engaging with the communities.

"This is an experiment to see if talented young students can get audiences around the world to find out about our game. So far it's working with our audiences growing steadily in all those countries," He explains.

Having already doubled its team, Simmons says with the steady growth *Robocraft*, he wouldn't be surprised if Freejam doubles its number of staff again in the next six months. ■

MOVERS AND SHAKERS

This month: Dovetail, West London Games, Dimensional Imaging, Oculus, Sports Interactive

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DOVETAIL SWOOPS FOR DEV TRIO

DOVETAIL GAMES *Train Simulator* studio Dovetail Games has bolstered its development team with the hire of three new and experienced staff.

Former Square Enix, SCi Games and EA developer **DARREN POTTER,** who boasts more than 20 years of industry experience, has been appointed as development director for the studio.

Ex-Lionhead, Climax and Escapist staffer **JORGE SANCHEZ** meanwhile has been named lead artist, having previously worked on titles including *Black & White* and the *Fable* series.

Former Bethesda and Avalanche Studios programmer **JONAS NELSON** has been brought in as lead programmer. Between the trio they bring decades of experience to the studio, which was formed just six years ago as RailSimulator.com.

The devs have been recruited as Dovetail looks to beef up its operations. The studio's VP and executive producer Rob O'Farrell has suggested the new hires could spearhead the development of brand new games and IP, away from the hugely popular *Train Simulator* series the firm built its success on.

"We are delighted to be welcoming Darren, Jorge and Jonas to the Dovetail Games family," said O'Farrell.

"Between them they bring extensive industry experience and expertise to the team, as well as a commitment to creating premium quality products. Their appointments will help us to continue to grow the business as we focus on developing a wide variety of simulation entertainment products."

Jonas Nelson, Darren Potter and Jorge Sanchez

WEST LONDON GAMES New developer West London Games, behind vehicle construction and combat PC title *TerraTech*, has appointed **SAI WUN POON** as producer.

Wun Poon has 16 years of industry experience, having worked at the likes of Headstrong, Ideaworks and Microsoft Soho Productions.

"Sai Wun is a fantastic producer, and the depth of his experience will add hugely to our already highly qualified team," said co-founder Russ Clarke.

"We feel it's important, even for small indie teams, to embrace professional working practices, such as production."

DIMENSIONAL IMAGING Games industry veteran **TIM CHRISTIAN** has joined the board of directors of Scottish facial capture firm Dimensional Imaging, bringing over 25 years over industry experience.

"I believe that the company's high definition facial capture technology has huge potential in the games industry, particularly with the introduction of the new generation of games consoles," said Christian.

"I am very much looking forward to helping DI expand further into the global games market and to capitalise fully on all of the opportunities that are available to the company."

OCULUS Valve's former director of business **JASON HOLTMAN** is the latest industry veteran to join VR outfit Oculus.

Holtman has been tasked with spearheading the firm's business development and developer relations for its Rift headset.

"I'm not one of the pioneering scientists or engineers in virtual reality, but I am one of the people that can't stop grinning every time I see something new inside the headset, and I'm looking forward to helping shape the transformative experiences that inspire the next generation of developers," he said.

SPORTS INTERACTIVE *Football Manager* dev Sports Interactive has bolstered its tech team with the addition of **ANDREW WILLMOTT** as senior software engineer.

He brings a wealth of games experience to the SI team, having spent more than 12 years at Maxis where he was lead engineer. Willmott will work closely with the match engine team to improve the game's 3D graphics.

"As a die-hard Spurs supporter and long-time *FM* admirer, I'm looking forward to doing everything I can to ensure that *Football Manager* looks as realistic as it feels," he said.

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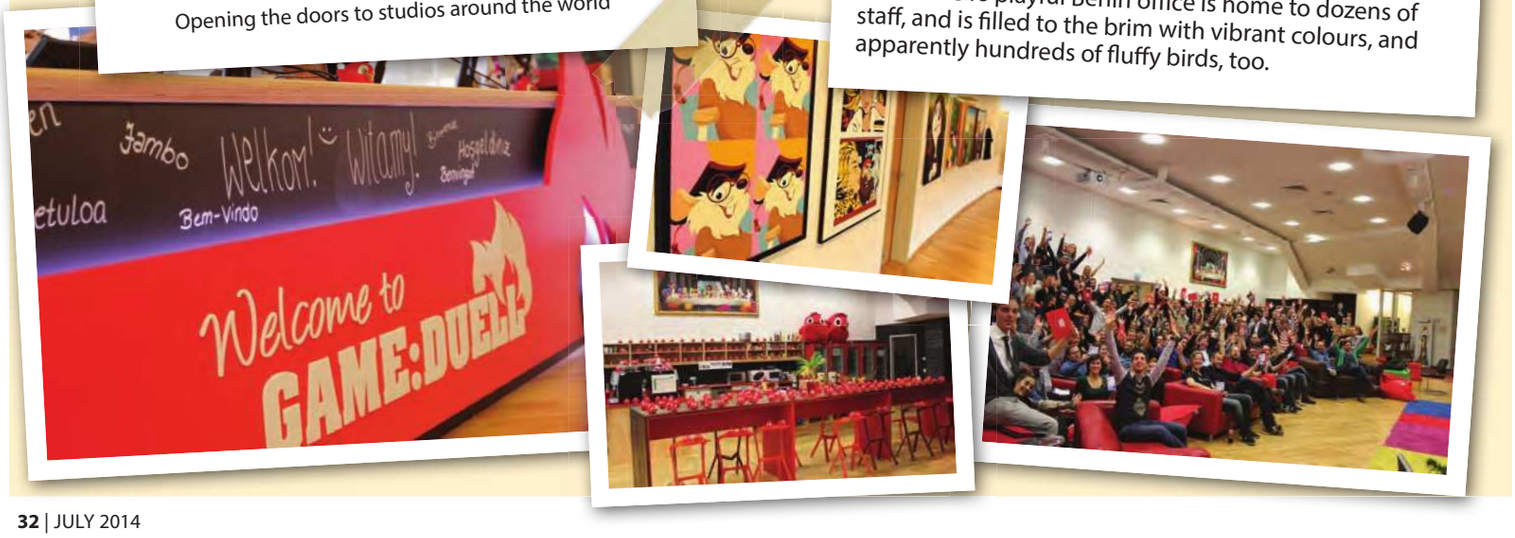

RECRUITER **HOT** SEAT

Philip Oliver discusses plans for his ambitious new Leamington Spa studio that's in the midst of a recruitment drive

What differentiates your studio from other developers?
Radiant Worlds is a new studio so you probably haven't heard of us. We haven't released a game yet, but the company has over 50 experienced devs currently making one game.

We have a fantastic opportunity afforded to us by one of the richest global publishers who have entrusted us to make what we consider to be our ideal game. While there is an overall vision, the team designs the title as they are working on it; so everyone has input and everyone cares. Together, working as a team we are making what we feel is a truly wonderful game.

How many staff are you currently looking to take on?
We are looking for between ten-to-20 experienced games developers within the next six-to-12 months. The majority being experienced programmers. Our publisher loves our PC game so much that they want to release it on a number of other platforms. Whilst it's not announced yet, everyone has extremely high hopes for its success.

What opportunities and perks are available to those working at Radiant Worlds?
The culture. We are working towards ambitious goals but everyone helps make the creative decisions required to get us where we need to be.

People who work at Radiant Worlds enjoy coming into work. They like the people that they work with, the environment they work in and the game that they all play a part in making. Everyone can contribute ideas whatever their position and the best ideas are taken into the game, regardless of where they came from. We also allow people to make titles in their own time, which they then completely own, so it's not an either/or choice at Radiant Worlds.

What should aspiring developers do with their CV to help ensure they get an interview?
Obviously talented people should send us their CVs and from that information we would hope to clearly understand why they are good at what they do.

Once our game is announced and people start to play it, we expect we will see a lot more people apply to work with us. Please send us your CV, come in for a chat and judge the game, the company and the team for yourself. We are pretty confident that once you do meet us, you'll want to stay and work with us.

We are setting our standards pretty high. We need some seriously good developers to join our elite team. If you think you fit the bill, then please get in touch.

Who is the best interviewee you have ever had and how did they impress you?
Having worked in the industry for almost 20 years and offered hundreds of people jobs, it's difficult to single any one person out. Generally those guys who are passionate about games; they love playing them and want to join a team to make better ones that come out the best.

If I had to choose just one, then it would be John. Almost 20 years ago, I took a call from a recruitment agency. 'I have a guy in the area, interviewing locally – could he come in and see you this morning?' I had no pre-conceived ideas about him when he came in to see us. He was young, shy and modest.

He said he'd seen this new art package called 3D Studio Max and it fascinated him. 'It's too expensive to buy, so I decided to see if I could write it myself'. He then loaded up his demo, and wow! He had done it all from memory and it looked amazing, with most of the functionality. We offered him a job on the spot.

And who was the worst?
There's confident and there's cocky. Some of the worst interviewees are those that think they know it all. I learnt very early on in my career that the more you learn, the more you realise how little you do know. People who think they know it all have not even started on their learning curve.

People should also learn to have a respect for seasoned professionals – it's important not to judge until you have all of the information. Nowadays, with access to information via Google etcetera, there is no excuse for coming to an interview unprepared. You should know about the company and their games, so please prepare.

Why should developers join a studio like yours when indie and self-publishing have become so much more accessible?
Experienced developers understand that success in the indie arena is a lottery. It can be very high risk and resources are limited. Big teams have experts in all disciplines and can help you aim for more ambitious goals.

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GET THAT JOB

Development specialists offer advice on how you can bag that career leap

THIS MONTH: CHARACTER ARTIST

REMEDY ENTERTAINMENT'S Eva Kovalainen describes her path into games development to become a character artist at the studio behind Alan Wake and the upcoming Quantum Break.

"I've dreamed of creating games ever since I was a little girl and got my first 8-bit Nintendo.

"The English language and USA being close to my heart, I decided to combine my passions and moved to Florida to study at the Full Sail University. It was probably the toughest study period of my life, as I crunched four academic years into two, but it was well worth it.

"After 22 months of hard work I got my bachelor's degree from Game Art. While being abroad I realised that I yearned to work in Finland. We have plenty of amazing success stories in the gaming industry and I wanted to be part of them. I wrote to Remedy about myself and mentioned that I was working on my demo reel. I got lucky and was asked to create a demo in which I put a lot of effort in and managed to meet the deadline, all this while finishing my degree.

> ***Making your way into the industry means a lot of work and learning new things every day.***
>
> Eva Kovalainen, Remedy

"The call finally came when I landed back in Helsinki and was invited to a job interview – the rest is history. I get to work in the inspiring company of my dreams, studying new 3D programs and methods. As they say; learning never stops and keeps life interesting. Thankfully my mentor has a lot of talent and patience, and my co-workers are brilliant. I'm happy that I get to help and be part of the team, and also that I'm involved in all these interesting projects already as a trainee.

"I grew up playing games, which means that they're part of my DNA. Now I get to define the future of gaming, so things couldn't get better. Making your way into the gaming industry means a lot of work and learning new things every day. It helps if you set yourself a goal and reach for it on a daily basis.

"If you're willing to put yourself on the line for it, you'll most likely achieve it."

www.remedygames.com

If you've got job advice to share, email **Craig.Chapple@intentmedia.co.uk**

Employee HOT SEAT

Goodgame's **Alina Zimmer** on what the studio with its own swimming pool can offer you

What do you do at your studio?
As a project manager and team leader I am at the interface between the departments. I optimise processes, set milestones, plan resources and lay down priorities. I also supervise and motivate my project teams and ensure that all information reaches the relevant people.

How did you get your current job?
During my degree, which was actually focused on film and television, I ended up doing a course on serious games and I was hooked. I got an internship in a small studio, followed by an orientation year in QA, and by that point I was totally convinced that the gaming industry was for me. And then three years ago I became a project manager at Goodgame Studios.

What perks are available to those working at the studio?
The flat hierarchies and the lack of bureaucracy are a big plus at Goodgame Studios. The atmosphere is relaxed, the team is relatively young. I really like the particular kind of identification with the products and the ability to change of the industry as a whole. Every individual in this company can make a real difference, whether it's the interns, trainees, permanent employees or managers.

What is the recruitment process like at your studio?
Once you've found a suitable position, it's best to apply by email. Post is a bit old-fashioned for our industry. You'll hear back very quickly from our HR department and if they're interested, you'll be invited for an interview. This can also be done over Skype, so distance shouldn't be an issue. Almost every candidate will also have the opportunity to try their hand at tests, which assess specialist skills. In the last stage of the interview we always try to initiate a normal conversation to get to know you a bit.

Name: Alina Zimmer
Title: Project Manager
Developer: Goodgame Studios
www.goodgamestudios.com

What was your own interview like?
My interview with Goodgame Studios was a lot of fun but nonetheless serious. We had a lot of laughs, and as soon as it was over I had the feeling that I wanted to work there.

> ***It's best to apply by email. Post is a bit old-fashioned for our industry.***

What's the studio atmosphere like?
The atmosphere is friendly and relaxed. I'm also friends with a lot of colleagues outside of work, which makes working together enjoyable.

Even when we're under pressure, it doesn't get hectic or chaotic. We always stay professional. Open office spaces and lots of perks like coffee, muesli, table football, and even a swimming pool make for a very pleasant and constructive atmosphere.

Do you feel as though your work has an impact on the studio overall – be that in its products, its team or its quality of life?
Yes, I notice how my work has a significant influence on the success of the products that I manage. After all, tasks can't be handled efficiently and smoothly without good communication. I have a comprehensive overview of the production process and I am the main go-to person for other departments. I provide answers for external team members and ensure production goes smoothly.

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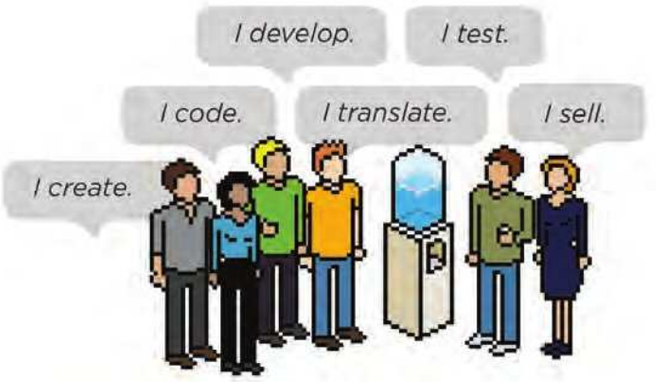

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Behind **the lens**

Silicon Studio strives to help games developers create post-processing effects that rival those of Hollywood blockbusters. In fact, the firm's flagship middleware Yebis 2 is so powerful, notable film studios use it, too. **James Batchelor** finds out more

A CASUAL VIEWING of almost any trailer that emerged from E3 this year shows that the games industry is highly unlikely to curb its cinematic ambitions. From Kojima's latest *Metal Gear* to the high-octane antics of *Battlefield: Hardline*, the new generation of games wouldn't look out of place on the big screen at your local multiplex.

And, as with Hollywood blockbusters, post-processing is essential in creating the mood developers want. The world of *Batman: Arkham Knight* would be nowhere near as impressive if not drenched in a sinister cocktail of darkness and neon.

Such effects are incredibly challenging to achieve without dedicated tech – and one of the leading tools available is Silicon Studio's Yebis 2. The Japanese firm's middleware specialises in post-processing effects that can be edited in real-time, and it's a suite that has proved very popular with games developers.

"Yebis has so many features and is so flexible that usually teams decide to use it because it saves them a lot of time and money," explains engineer manager Colin Magne. "If they had to develop the things Yebis does by themselves, it would be a huge amount of work."

The effects Yebis 2 can create adds an extra level of sheen and high quality to visuals, as shown by this before (top) and after (bottom) example

Main: Pixar has recently started using Yebis 2, integrating the middleware into its rendering pipeline to add post-processing effects faster

Below: The Silicon Studio team (left to right) – engineer manager Colin Magne, executive director Fumiko Kato, CEO Takehiko Terada and engineer Steven Tsang, all gathered around their favourite magazine

"Post-processing is very important to the final emotion of the picture, which is usually set and defined by the art director of the game or production. Yebis has such high quality and fine-tuning that almost anything the art director wants to achieve is possible.

"We have seen many relatively low-end customers including Yebis in their engine and giving their tech a whole new look that's very organic and realistic. And it doesn't even have to be realistic: Yebis can help with rendering based around non-realistic games, and it always offers a high emotional picture level. That's something I personally never see in other middleware."

Engineer Steven Tsang adds: "There are more than ten years of research behind Yebis – and our customers recognise that. One of the responses we often get is how fast it is. It's scalable because you can set the balance between quality and performance yourself if you want. Most of the developers that evaluate Yebis are very impressed with the performance that we can deliver."

SILICON'S SHOWCASE

You've almost certainly seen Yebis at work, although you might not know it.

The middleware is used in a wide variety of games, from the next-gen *Dragon Ball* title unveiled at E3 to Square Enix's upcoming RPG epic *Final Fantasy XV*, as well as *Agni's Philosophy*, the real-time demo of Square Enix's new engine – and the Japanese publisher has since said it could not have achieved the look of this demo without Silicon Studio's tools.

The *Final Fantasy* firm is just one of Yebis' Eastern admirers, with Bandai Namco and Koei also using the technology in their games. But while this is high praise for Silicon Studio, the Japanese company's ambitions stretch beyond its home market.

"Yebis is very successful in Japan because it is such a unique and special middleware," executive director Fumiko Kato tells *Develop*. "But we need to expand our global business and that's been our focus since launching Yebis 2 last year."

> ***"Pixar's use of Yebis speaks to the quality and how serious we are about simulating camera physics."***
>
> Colin Magne, Silicon Studio

Silicon Studio has made great headway in this, with the renowned Pixar picking up Yebis to enhance its world-conquering family flicks.

"They have Yebis integrated into their rendering pipeline," Tsang says. "It makes their iterative process much quicker because Yebis runs in real-time, as opposed to having to export things and applying post-processing as a separate step."

Engineer manager Colin Magne adds: "Yebis is very important for the final image expression. At Pixar, they really play with camera settings, particularly in areas where Yebis has its strengths like depth of field.

"This is something that is traditionally very expensive in terms of computer power. Pixar couldn't do that in real-time until they decided to use Yebis. It saves a lot of effort for their camera set-up at pre-production and pre-rendering time, when they first set the movie layout.

"The fact that Pixar uses it speaks to the quality of Yebis 2 and how serious we are about simulating camera lens physics. Pixar is happy because even the depth of field radius is similar to what it should be in the real world, so it's fitting with the offline renderer they use for the final picture.

"It's something people don't usually think about in games, but we covered it so the final picture is realistic and even more importantly, natural looking."

EASY INTEGRATION

Part of the reason many studios utilise Yebis is that Silicon Studio has engineered the toolset to fit seamlessly into almost any pipeline already in use.

"It's actually pretty easy," assures Magne.

"The only input Yebis needs is the colour information, the depth information and maybe the motion vector information if you want motion blur.

"Basically, at the end of the pipeline for your rendering engine, when you have your near final picture before post-processing, you just pass this information to Yebis and take a look at the output. We have seen people integrating Yebis in less than a day."

Square Enix – a shareholder in Silicon Studio, along with Bandai Namco – has already integrated the technology into its new-gen engine. Meanwhile, a recent partnership with French middleware firm Allegorithmic has seen Yebis added to the company's range of Substance texturing toolsets.

While Yebis 2 might shine brightest on Xbox One and PS4, Silicon Studio has also gone to great lengths to get it across multiple platforms – 18 of them, in fact. That encompasses not only traditional consoles and handhelds, but also a variety of smartphones and tablets. In fact, Google used the company's Yebis 2 demo to show off the power of the Nexus 7 tablet.

"Each customer comes with different needs, so we have ported Yebis 2 onto 18 different platforms as of today," explains Magne.

"That was a big challenge, but it has also strengthened Yebis. Each time, we added specific optimisations and algorithms that we could take advantage of on each platform afterwards. It makes it very efficient and very scalable.

"Of course you will achieve the best quality with the high-end consoles. Yebis is already available and optimised for PS4 and Xbox One. But recently, we have brought Yebis to a number of mobile platforms, in which we also have an interest. We released an OpenGL ES3 demo of Yebis' features on Google Play – there are some interesting effects we can do thanks to the new OpenGL ES3 so we're looking into what we can do with this and we'll expand from there."

LIGHTING THE WAY AHEAD

Yebis 2 may be beloved by games developers and film-makers alike, but Silicon Studio isn't about to sit back and relax. On the contrary: the Japanese middleware firm has world domination in its sights.

The Allegorithmic partnership goes some way to supporting these efforts, as does the use of Yebis in *MotoGP 14*, the new-gen racer being developed by Italian studio Milestone. But the biggest boost should come from the imminent launch of Yebis 2's successor.

> ***"There are more than ten years of research behind Yebis 2 – and our customers recognise that."***
>
> Steven Tsang, Silicon Studio

"We're planning to launch Yebis 3 this summer," Kato reveals. "We are going to promote in Japan first, and then prepare to release overseas. We'll be promoting as well."

And Magne adds that Yebis 2's features have been so well-received that the team has been free to explore new possibilities for the toolset, rather than refining what has already come before.

"People are extremely happy with what we deliver right now, so there is nothing we need to improve on," he says. "It's more a case of adding new features. Rather than learning from Yebis 2, we're continuing from it."

The new features of Yebis 3 have largely been based on the most popular requests from established Yebis users. Headline features of the next version include SSAO (screen space ambient occlusion), higher quality depth of field effects and even lens dirt – again underlining Silicon Studio's commitment to recreate realistic camera effects in games.

That's not to say Yebis 2 will be completely replaced by its follow-up. Silicon Studio will still continue to support the middleware as it reaches out to more Western developers and even film studios to get its post-processing tools into the hands of the most gifted creators while it eagerly waits to see what these teams can do with the power of Yebis. ■

www.siliconstudio.co.jp/en/

MORE THAN MIDDLEWARE

YEBIS IS JUST one feather in Silicon Studio's cap – albeit the largest and most colourful. The company offers a range of other services for Japanese games developers and is keen to provide similar support to Western firms.

"We're probably one of the only middleware companies to survive in Japan," executive director Fumiko Kato tells *Develop*. "Our strength is our one-stop service for developers. We offer support in the form of tools and middleware, as well as full game development, we provide people, and we provide consulting and networking services. So we have a lot to offer the games industry."

Key to this expanded selection of services is Silicon Studio's own games development team. The in-house studio has produced a variety of titles over the last few years – most notably, Square Enix's 3DS RPG *Bravely Default* (*below*) and PS3 exclusive *3D Dot Game Heroes* (*above*). In fact, the latter served as another great showcase for the effects Yebis can produce.

"They're creating really great games, and they have a really high reputation," Kato says of the studio. "When we started to sell middleware, we didn't have a games studio, but it's hard for us to sell middleware without us creating games for ourselves. With our own studio, we can test and run and use our middleware to create great games.

"A lot of publishers already come to us to make a game in our studio. And because we're not a publisher, we can concentrate our own original titles."

Tech demos such as Agni's Philosophy by Square Enix (above left, top) and Silicon's own RigidGems (above left) show off some of the effects Yebis 2 is capable of creating

Standard procedure

As the tools and techniques of automatic creation become more widely used, **Craig Chapple** speaks to seasoned developers about how procedural generation is being used to develop new and exciting experiences

Top to bottom: Frontier's David Braben, Serious Brew's Maarten Brouwer, Kitfox Games' Tanya Short and SpeedTree's Kevin Meredith

SOME OF THE BIGGEST games now in development have begun embracing procedural generation.

Last month's E3 played host to Frontier's space sim *Elite: Dangerous* and Hello Games' *No Man's Sky*, surprising attendees with their ambitious plans and enormous universes.

In fact Hello Games' Sean Murray said his studio's game, created by a small team, would take place in an entirely procedural universe that was "infinite" in size.

"Even we don't know what's out there," he claimed while on stage.

The technique is used to automatically build levels and environments based on a set of rules and a plethora of assets, but can also be used to randomly generate items, fauna and other gameplay elements.

Despite the random factor, however, Frontier CEO David Braben says the game itself should not feel completely randomised.

"If it does feel random, then it is bad procedural generation," he states. "Imagine creating the 3D texture of tree bark up close – it should look just like the bark of a real tree.

"How it was created shouldn't matter – whether from some complex procedural technique mimicking the way the bark formed in real life, or an artist, carefully sculpting the peaks and troughs to match real life.

"If the results of both approaches are visually indistinguishable, then the first method should be better, as you can then create as many differently curved tree trunks as you like, whereas an artist would have to, largely, start again. It is all about rules – and how to express them so that a procedural system can conform to them."

During the last few years in particular, procedural generation has proved immensely popular among indie developers, and is also being used in part by the larger, triple-A studios for certain aspects of their titles.

But why is it such a hit with some small developers over more controlled experiences?

"While big developers can afford to build specialised level design tools, this often isn't feasible for indies, so procedural generation can be an interesting option as an alternative to time-consuming manually crafted levels," says Serious Brew developer Maarten Brouwer, an expert in procedural generation following his work on *Cargo Commander*.

> ***"Procedural generation is a black hole of design, ready to eat your life. But in a good way."***
>
> Tanya Short, Kitfox Games

"It also offers the possibility of seemingly unlimited playtime based on a limited amount of assets."

Kitfox Games creative director Tanya Short, who has worked on games including turn-based RPG *Shattered Planet*, agrees that procedural generation is a smart business move for many indies, who are to some degree competing with big publishers. She adds that the technique offers a novelty and design aspect that many are keen to explore further, in turn generating fresh experiences.

"In short, we like new things. We like puzzles and problem solving and even a bit of risky adventure – and what's more of an interesting puzzle than procedural generation?," she says.

"It's a puzzle within a puzzle, with a new challenge revealing itself with every playthrough. There's a reason *Rogue* and *Dwarf Fortress* are 20-year projects. Procedural generation is a black hole of design, ready to eat your life. But in a good way."

KEEPING CONTROL

Short paints a picture of the process of procedural generation as one that is actually tightly managed. She explains that the team first hand-builds an example level in the editor – in her case Unity – and then analyses the various elements that make each level fun.

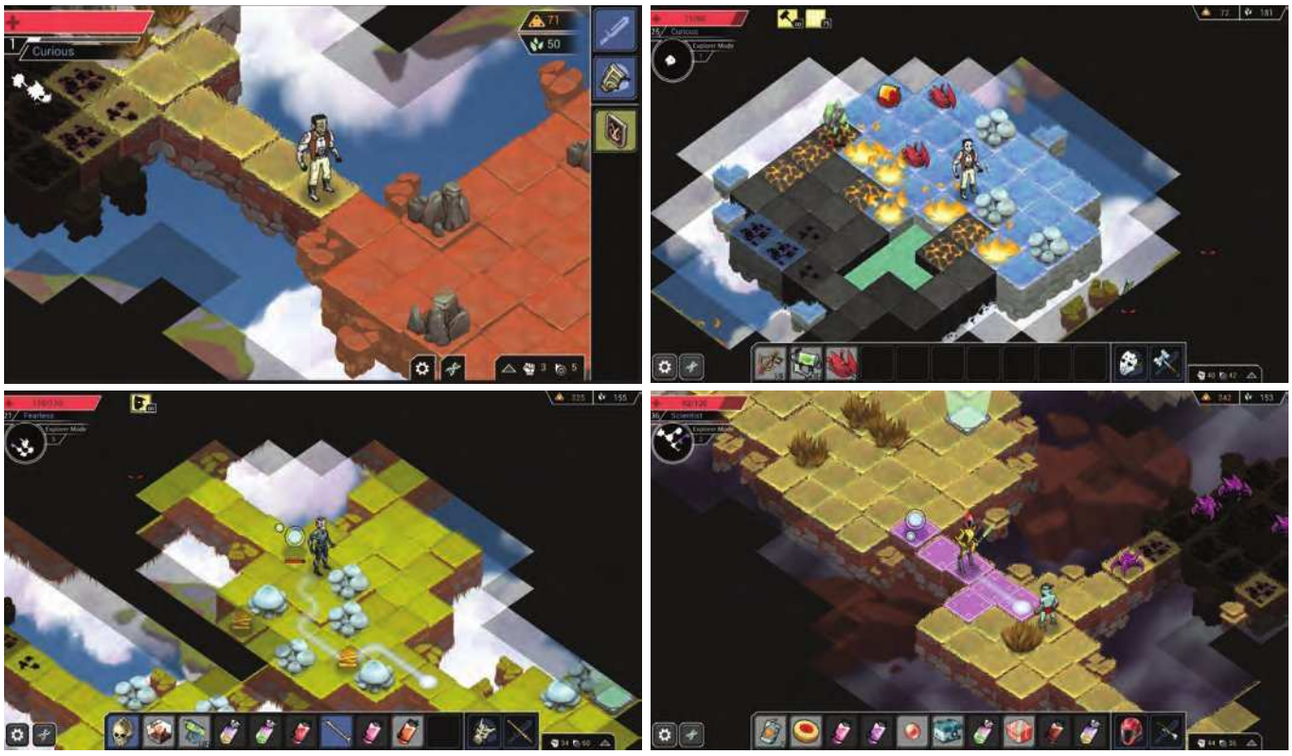
After this, developers can break down the design into rules, deciding how many tiles wide a room and corridor should be at minimum and maximum levels, how treasure and enemies should be placed and even what kind of decorative elements need to be placed and how, among other considerations.

"You usually think of procedural generation as writing on a blank page – drawing lines on graph paper," she says.

"But really, it's more like taming this wild infinite possibility where literally anything can happen, and limiting it to only a certain subsection of things that can happen."

But when creating such a set of rules, how can developers stop a game that can essentially create levels itself from becoming boring and repetitive for players? Is there an issue that a lack of control can, at least to some users, result in an unintentionally monotonous experience?

Short recommends that to avoid a set of rules making a game "bland and samey", as the algorithm will do exactly what a developer tells it, devs should create some exceptions to a rule.



Left: Kitfox Games' Shattered Planet is a turn-based, randomised RPG, that constantly creates new locales for the player to explore

Far left: Frontier is using procedural generation in Elite: Dangerous to create a billion star systems

Brouwer says part of the fun in procedural generation lies in the lack of control, and admits he often gets tired of the carefully designed events of more traditionally developed games.

"It can be much more exciting to play something that I know is unique for me, and of which the possibilities and outcomes aren't fixed at all," he explains. "As a designer, it's the trick to find out what parts to control and what parts to let go, without levels getting too hard (or impossible) or too boring.

"The game mechanics matter a lot; it's much easier if they are fun regardless of the context or environment. In that regard, game-influencing procedural generation is not something to 'tack on' or to simply replace manually designed content; the game really should be built around it."

CUTTING COSTS

One of the key benefits touted for procedural generation is the cutting of costs, even for triple-A games. As with Hello Games, Sean Murray's small team has been able to create what, on the face of it at least, looks like an enormous universe. But it can also be used to take care of other elements of development.

Kevin Meredith of Interactive Data Visualization, the company behind vegetation modeling and rendering tool SpeedTree, believes such tools can dramatically reduce the time required to model and place assets.

"This lets artists spend more time on other parts of the game, as well as get the game done more quickly and at higher quality," he says. "So not only are there time and money savings in procedural development but also the increased revenue that results from a better game launched sooner."

Brouwer feels the technique is already widely used to minimise certain level editing tasks, such as the aforementioned terrain vegetation and dirt decals, as well as enemy spawns and loot drops.

He warns though that procedural generation should not be always be the go-to to simply replace manually crafted content or create 100 hours worth of gameplay.

"Usually it takes a lot of time and effort to work, and requires changes in the entire game design to work well," he explains.

"When players have encountered too many games with cheap implementations, they will stop seeing procedural generation as an interesting quality and start equating it with bland repetitiveness. But as a core part of a game it can not only lower costs, but make it possible to create really new experiences."

> ***"As a designer, it's the trick to find out what parts to control and what parts you have to let go."***
>
> Maarten Brouwer, Serious Brew

But Braben believes procedural generation will not cut costs, at least in the bigger, triple-A titles. In fact, he says it could result in the opposite.

"Ironically there is a danger that it could cause an increase in costs, for triple-A games at least, over time because frequently such game development is constrained by limits; system memory, disc space, render performance, network bandwidth and so on, and the best game is the one that makes the best use of those limits," says Braben.

"Procedural generation enables a great deal more content to be included in the same memory footprint and bus bandwidth, hence requiring more art time, and so greater cost."

Whether it can truly cut costs, and that seems dependent on scale and use-case, there's an exciting future ahead for procedural generation in games. And with more indie developers getting to grips with the tools and techniques behind it, who knows what implementations we might see in the next few years? ■

SPEEDTREE UP DEVELOPMENT

VEGETATION MODELING AND rendering middleware SpeedTree uses procedural generation to create trees and plants throughout a game's environment. The tool has been used in *Battlefield 3* (*pictured*), and is set to be integrated into Bungie's new-gen outing *Destiny*, too.

Interactive Data Visualization director Kevin Meredith says using such a tool and other procedural generation-based tools and techniques can help studios trim their development costs, particularly indies.

"Trees made from scratch can take days or weeks to get right, while we've had SpeedTree users procedurally churn out a whole planet's worth of amazing vegetation in less than a day," he explains.

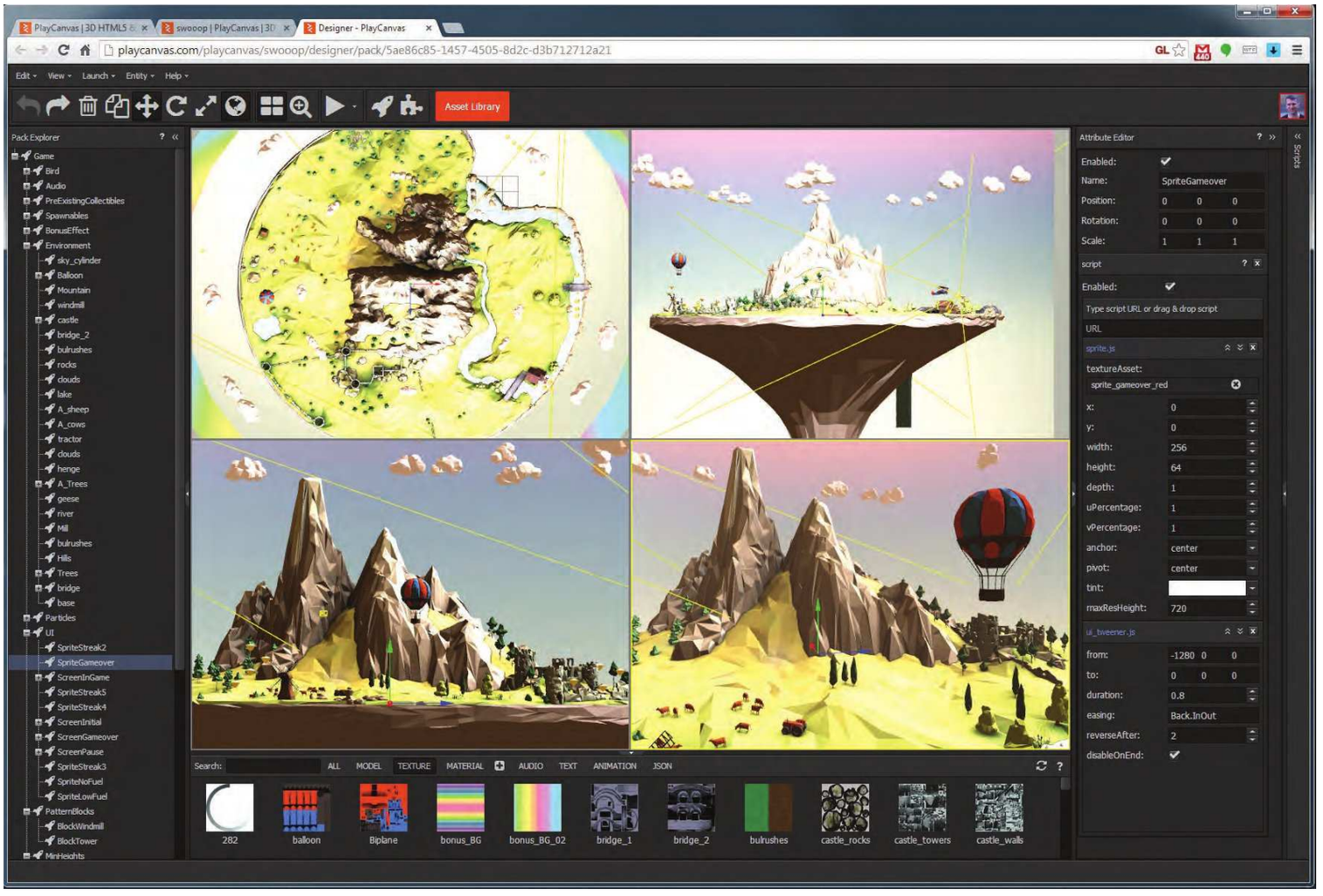
Frontier CEO David Braben also believes using such tools to automate the creation of environments with trees and plants could be increasingly adopted by developers, particularly as game worlds get bigger.

"If asked to create a 3D forest, typically an artist will create three or four tree models, and randomly scatter them about, cutting and pasting liberally, with each tree differently oriented, and perhaps some colour variation, and the odd stretch to the meshes to hide repetition," he says.

"He or she is following a simple procedure. That is a form of procedural generation. Automating such a process is an obvious step, and will save a great deal of time and storage."

Reframing **the game engine**

PlayCanvas offers something distinct from the established game engines, and it's just gone open-source. **Will Freeman** speaks to CEO and co-founder Will Eastcott about providing an alternative tool for development



Will Eastcott (above) says PlayCanvas (main) is a direct response to the plethora of available platforms and the nature of the increasingly adopted distributed development method

What makes PlayCanvas a distinct engine?
PlayCanvas is the world's first cloud-hosted game development platform. It has been built on top of our open-source engine that's written in JavaScript and powered by HTML5 and WebGL.

It provides all of the things you would expect from a modern, cutting edge engine: a visual editor, integrated physics engine, advanced graphics and so on. Beyond that, PlayCanvas is completely unique. The tools are multi-user in the style of Google Docs. It's the first engine to run on mobile as well as the desktop. And because PlayCanvas is a website, we've been able to build a rich social experience around the tools.

You very recently switched the engine over to be open-source. Why?
It really comes down to what's better for the developer. It's completely clear that PlayCanvas users are better off for having full, unrestricted access to our codebase. They're able to figure out precisely how the engine works, debug when things go wrong and drive it in the most efficient way possible.

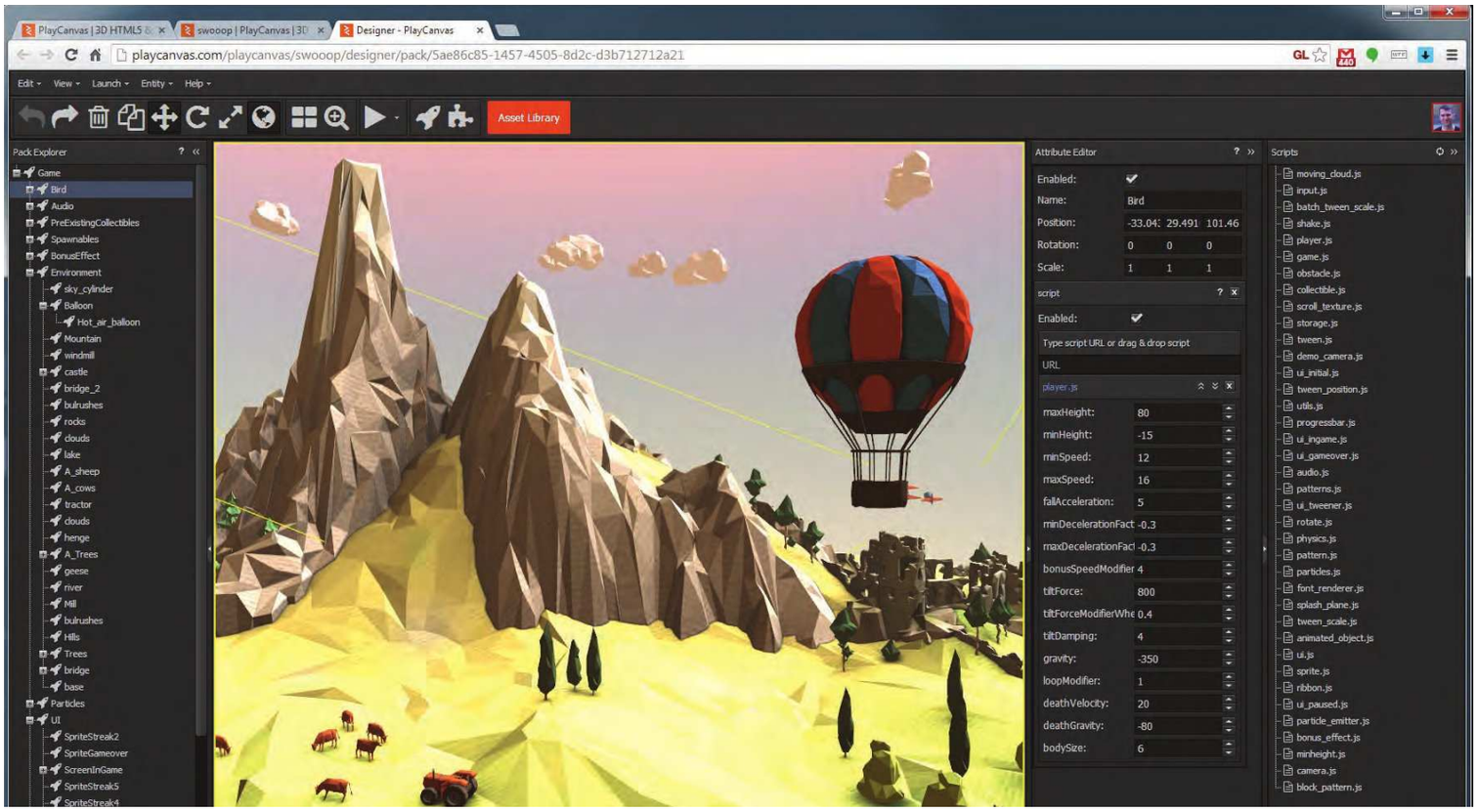
They're also able to directly contribute to the development of the engine, whether that's correcting a spelling mistake in a code comment, or submitting a major feature back for integration. It's a major win for all parties.

In the traditional middleware space, open sourcing technology is highly unusual. But in the world of web development, companies are pretty relaxed about it. There's definitely a cultural difference there, and something that took us a while to adjust to, but I'm 100 per cent confident it's the right move for us.

What do you think the long-term impact of going open-source could be, in terms of the its evolution and the games it creates?
In the long-term, we'll see the engine become more stable, perform better and offer more features than if we had remained closed source. This is all very good news but what excites me is finding smarter, more efficient ways of making games. It's the tools that matter. I strongly believe that the web and the cloud will see the rise of interconnected applications that can co-operate in ways that would be impossible on the desktop.

So down the road, we'll see the engine driving an ecosystem of tools that will complement our cloud platform. For example, imagine an online, collaborative 3D sculpting tool that can pipe models directly to a user's project on PlayCanvas. Or a tool that can read models from PlayCanvas projects, optimise them somehow and write them back. The PlayCanvas engine can power all of these kinds of projects.

And why a WebGL/HTML5-focused engine?
A lot of start-ups form out of frustration and PlayCanvas is no exception. In the engine space, there's way too much emphasis on rendering prettier pixels. Engine technology simply hasn't adapted to massive changes in how we work. Today, I regularly collaborate with others in cloud applications. I spend just as much time on a mobile device as I do on a laptop. And I spend too many hours on social networks. It seems obvious to me that any engine that's built to address these shifts will be built on the web, for the web. HTML5 and WebGL are the only serious choice of technologies to make that happen.



PlayCanvas (above) can be accessed online without any large downloads or lengthy install processes

But there's another major reason why WebGL and HTML5 appealed so much. A key goal for us is to open up game development to the widest audience possible. Mozilla came up with some fascinating stats last year: there are 200,000 iOS developers out there and 600,000 Android developers. How many web developers? Eight million. The vast majority of these know JavaScript and can start developing games via PlayCanvas right away.

The engine's hosting and 'simple publishing' abilities seem core to what you've built with PlayCanvas. Why and how is that important with the engine?
Games are made to be played. But it's amazing how difficult developers make it for people to play their games sometimes. Weighty downloads, lengthy installs and frequent updates are examples most of us are familiar with. One of the key strengths of the web is that games can reach the end user in record time.

A 'one click' publish from your PlayCanvas project followed by a tweet can result in an avalanche of players accessing your game. App stores are great for monetisation, but nothing beats the web for virality.

Of course, we do recognise it's critical for devs to be able to publish to app stores as well. This is why we have partnered with a company called Ludei whose CocoonJS technology can trivially wrap HTML5-based games as native apps for publishing to Google Play or the iOS App Store. It's a very quick and easy process.

Exactly what kind of studio types or models was the engine conceived for? Perhaps you'd consider it suitable for a broader spectrum than just small teams?
We've built PlayCanvas to address the needs of indie developers. I'm talking about small, potentially distributed teams who are looking to make money from their titles. That said, it's also a great fit for game jammers, students, enthusiasts and so on.

The sweet spot for PlayCanvas is casual, social and mobile games. Since triple-A game development projects are relatively few in number, it's just not something we've been focusing on.

> ***"I'm struggling to think of what else we could do to make games development any more accessible."***
>
> Will Eastcott, PlayCanvas

Let's talk in more detail about the core abilities. What features would you say define the engine and will offer users the most opportunity in terms of the games they make?
We have an awesome feature set in our runtime engine and visual editor. But we've set out to change how people make games so the core features that really set us apart are mainly workflow related. Realtime collaboration is absolutely key and a complete revelation for games developers who have been forced to effectively work in isolation year-upon-year. Check out engine forum threads on the subject of collaboration and team-working and you'll sense the frustration.

Cloud-storage is another major feature which grants an amazing amount of freedom. Sit down and develop on any machine you choose. There are well-understood reasons why the world stopped using Outlook Express and started using Gmail.

Another cornerstone to the engine is the community. It's just not sufficient to claim a forum and a Q&A site constitutes a community today. We follow, we star, we like, we share. We want to be able to engage with like-minded individuals, to teach, discover and learn. PlayCanvas lets you do all this since everybody works online and stores their projects on playcanvas.com.

How does the existence of – and recent changes to – PlayCanvas reflect trends in the industry? In other words, how is it a response to the way you see the games making business going?
The main trend of the last 15 years or so is that technology for games development has become cheaper and easier to access. PlayCanvas is the next logical step down that path. The runtime is open source and distributed under a liberal MIT license. The tools sit on a URL and developers have nothing to download or install. You can access the toolset from your smartphone or tablet as well as the desktop.

The tools are free to use and even the premium subscription accounts are incredibly cheap. We've got to the point where I'm struggling to think of what else we could do to make games development any more accessible than it is with PlayCanvas.

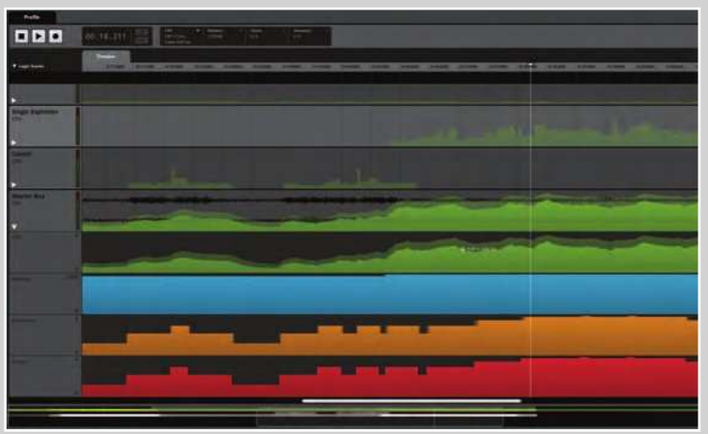
More generally, we're seeing a thriving indie development community scoring some amazing commercial successes. We're seeing more and more outsourcing and distributed teams. There are more platforms to target than ever. PlayCanvas is a direct response to all of this.

I think it's also important to look at some of the trends beyond the games industry. Productivity applications of all types are now migrating into the cloud and subscription-based SaaS platforms are now commonplace. Making video games is a team-based, multi-discipline activity so if any industry can benefit from these ideas, it's ours. ■

www.playcanvas.com

Turn up the volume

As developers aim to immerse players in brand new experiences on mobile, new generation consoles, PC and beyond, audio is playing an increasingly important role in captivating audiences. **Craig Chapple** uncovers the top tools to ensure your game sounds as good and clean as possible and lives up to consumers' consistently rising expectations



FMOD

Company: Firelight Technologies
www.fmod.org

AS ALREADY FEATURED on page 19 in this issue, Firelight Technologies' audio tool suite FMOD Studio is widely used in the games industry. In recent times it has been used in Supergiant Games' *Transistor*, Turn 10's *Forza 5* and in Evolution's upcoming *Driveclub*.

The tool is used for creating sound generators and effects, among numerous other uses. The recent release of FMOD Studio 1.4 also added extra platform support and enhancements to the profiler to feature live game output recording, playback and scrubbing, as well as support for a host of new data tracks including per event instance, voice, CPU, parameter values, 3D values and instance tracking.

WWISE

Company: Audiokinetc
www.audiokinetic.com

ONE OF THE most popular audio tools used in games, Audiokinetic's wwise suite has been built for both indie and triple-A developers to use.

The tool can be integrated into a number of engines, including Unity, Unreal Engine 3 and 4, CryEngine and development toolset Marmalade, and supports 14 platforms in total.

The tech features HDR audio, a number of built-in effects and has a series of plug-ins available, including SoundSeed, which we have also profiled for this guide (*below*).

Recently the tool was made free to indies via a limited commercial licence, which allows devs using less than 100 sound files in their wwise project to use it at no cost.

3DCEPTION

Company: Two Big Ears
www.twobigears.com

BUILT BY SCOTTISH outfit Two Big Ears, 3Dception is a real-time, cross-platform binaural engine designed to make it possible for users to hear sounds at specific in-game locations.

It is currently available as a plug-in for Unity on Windows, Mac, Linux, Android and iOS, with more platforms to be announced in the near future.

The tool simulates the way humans hear and how we can find the location of a sound in the surrounding environment. It does this by making calculations in real-time to filter the sound in a way that makes such an effect believable.

Its creators tout the tool as ideal for virtual reality games.

SOUNDSEED

Company: Audiokinetic
www.audiokinetic.com

AS WELL AS developing wwise, Audiokinetic has also built a useful plug-in for its audio toolset in Soundseed, a family of interactive sound generators.

Synthesised sounds can be used alone or combined as a layer on top of other pre-recorded sounds to generate audio. SoundSeet Air can be used to create "infinite" variations of wind and whoosh sounds that can change based on what's happening in-game. SoundSeed Impact meanwhile uses modal synthesis to create variations in the resonance of a base sound.

Licences for SoundSeed cost between $750 and $5,000, with further costs for each extra platform the middleware has been used for.

ASTOUNDSOUND

Company: GenAudio
www.genaudioinc.com

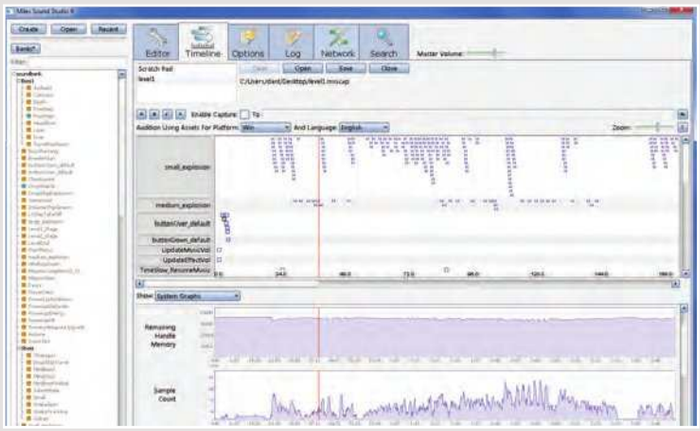
GENAUDIO'S ASTOUNDSOUND FOR gaming tech gives developers the ability to control sound movement in real-time to help present a realistic 3D sound field through placing and moving sounds around the listener.

Plug-ins are available for Audiokinetic's wwise, Firelight's FMOD Studio and Microsoft's XAudio2, in addition to allowing for custom integration into proprietary audio engines, ensuring a flexible tool, whatever a developer's pipeline.

There are three AstoundSound 3D audio spatialisers, including the mono to stereo 3D audio processor 3D real-time interface, multi-channel to stereo fold-down processor FoldDown and stereo expansion and enhancement processor Expander.

These spatalisers are scalable to different platforms, from mobile devices to high-end PCs, and help provide precision 3D audio spatialisation using XYZ coordinates of game sound objects, and are compatible with any stereo output during gameplay.

Licensing options are available on a per title or per-platform basis.



MILES SOUND SYSTEM

Company: Rad Game Tools
www.radgametools.com

THE MILES SOUND SYSTEM has been around since 1991, and is still being used by developers today. In fact, to date it has been licensed for more than 5,200 games across 14 different platforms.

The audio toolset integrates sound authoring with 2D and 3D digital audio, and features streaming, environmental reverb and multistage DSP filtering, as well as optimised audio decoders for MP3, Ogg and Bink Audio.

The latest features in version 9.3 include a completely redesigned toolset designed around iteration and soundscape debugging, allowing designers to capture a game's sound event stream and replay it as many times as they choose. It also includes editing for audio pre-sets, events, environments, filters, and mixing.

The Miles Sound System supports a range of gaming platforms including iOS, Android, PC, Mac, Linux, PS3, Xbox 360, Wii, 3DS, Vita and also the powerful new generation consoles Wii U, PS4 and Xbox One.

CUBASE 7.5

Company: Steinberg Media Technologies
www.steinberg.net

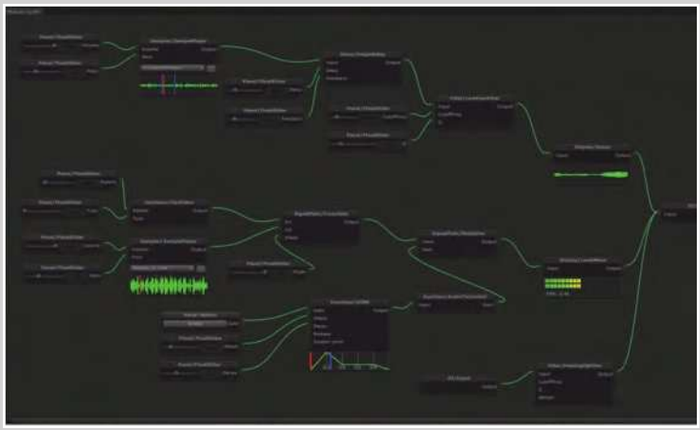
CUBASE IS A digital audio workstation that offers dedicated tools for designers to record, edit and mix audio.

The audio engine behind Cubase delivers 32-bit floating-point resolution and 192 kHz sample rate. It supports both small and large recordings, and its user interface uses customisable track views and custom colour schemes for tracks to differentiate types.

Users can also integrate VST Expression into the tool, which offers a way of working with instrument articulations, dynamics and multiple controller values.

Other features include the Instrument (t)rack, which supports multi-outputs and multi-inputs and merges the instrument tracks with the Instrument Rack, LoopMash FX for real-time breaks, tape-stops and stutters and remote recording plug-in VST Connect SE 2.

The tool is used by a number of developers, and has previously been used in games such as *Pokemon Black & White* and *Tron: Evolution*.



FABRIC

Company: Tazman-Audio
www.tazman-audio.co.uk

FABRIC IS AN audio toolset built by Tazman-Audio for the Unity game engine that offers a number of features and custom user interfaces to create audio directly within the tool itself.

Sound designers can make complex audio structures and use the event-based system to reduce the dependence on programmers.

The tool allows the design of multiple types of audio behaviours, and all the game audio assets are located under one hierarchy, to help make it easier for users to manage and locate assets.

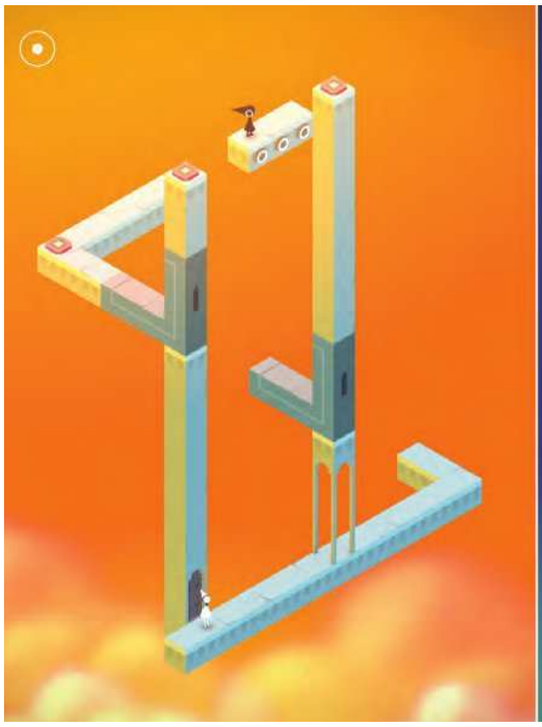
Fabric is written entirely within Unity's scripting language, meaning external native plug-ins are not required and it can support any gaming platform that the engine itself does.

Other features included with Fabric are a custom user interface, an event system, a VolumeMeter component to measure audio levels of a specific node and the ability to use the Unity engine's object-based hierarchical structure to build complex audio behaviours.

HEARD ABOUT

Sounds of the Valley

John Broomhall talks to Stafford Bawler about creating audio for Ustwo's intriguing mobile title Monument Valley



To make the sounds of Monument Valley (main), Stafford Bawler (above) used Tazman's Fabric plug-in for Unity, which he describes as 'the result of FMOD Studio and wwise having a baby'

STAFFORD BAWLER'S WORK for the creators of *Monument Valley* – London-based Ustwo – has secured him a coveted nomination in this year's Develop Awards.

"I'm absolutely blown away," says Bawler. "The game reviews and feedback on the audio have been incredible. The whole thing has been really inspiring and has also proved a valuable learning experience.

"From the get-go, Ustwo were clear the audio should be light, ambient, positive and uplifting. The player's viewpoint is a high-up isometric view – kind of remote – making you lean towards treating the sounds as if they're sort of miniaturised, but actually, these are full-scale structures and the main character you see walking around. Princess Ida, is a normal sized human being, so these are absolutely massive monuments.

"I started out creating background ambiences based on realistic sounds – and this extended to my approach for materials, say stone-dragging sounds for large slabs of marble sliding against each other, but over a period we realised I was chasing my tail a bit – looking for better and smoother material sounds and more perfect ambience. It became apparent something more abstract was needed, including sounds with musical tonality (with music being the ultimate abstract sound).

"The result was that both individual object sounds and the ambient backdrop became very musical and harmonious – and the more we went on, the less we wanted audio realism. With this principle established, my design approach was completely unlocked and I focused on the mood and story-telling for each chapter. It became a more artistic and compositional kind of approach."

The audio elements were implemented using Tazman's Fabric plug-in for Unity, enabling Bawler to run the most recent build of the game and manipulate and edit the audio in real-time.

"This was my first time working with Unity and Fabric, so it took a bit of time to get used to the Unity Environment and the way Fabric ordered things. However, all the usual audio middleware conventions were there.

> ***"Working on this title has definitely made me think about music and sound design for games differently."***
>
> Stafford Bawler, sound designer

"With Fabric it's almost like FMOD and Wwise had a baby and I really like the parent-child hierarchy structure Fabric uses, which fitted well with my way of working.

"Early on in the project I was able to lay out an ordered structure of mix groups and audio systems with relative ease. The way Fabric dynamically handles the various links between game objects and named events is very forgiving and flexible as well, so I was able to change things around when needed without much fuss or the need to track down broken links. This is great when you realise there's a better way of ordering things within an established audio system some way in to the project."

SMOOTH FABRIC

Bawler adds that one particular aspect of the implementation he enjoyed was how Fabric works inside the Unity editor environment alongside the rest of the objects and code.

"As long as the Fabric events have been hooked up, any changes you make can be heard immediately – as soon as you run the game. The removal of the step of having to build the audio for a game, then either drop it into a runtime location or check into source control (and wait for a build) made the overall integration process quicker and smoother.

"I was also able to make changes to the audio whilst the game was running, although because I was working with the audio structure as a Unity prefab, there was one small drawback – the changes you make aren't preserved when you stop the game running. This means you have to note what tweaks you've made and then apply them to the prefab, which can lead to headaches if you forget to make notes – but isn't a problem once you're aware of this little idiosyncrasy."

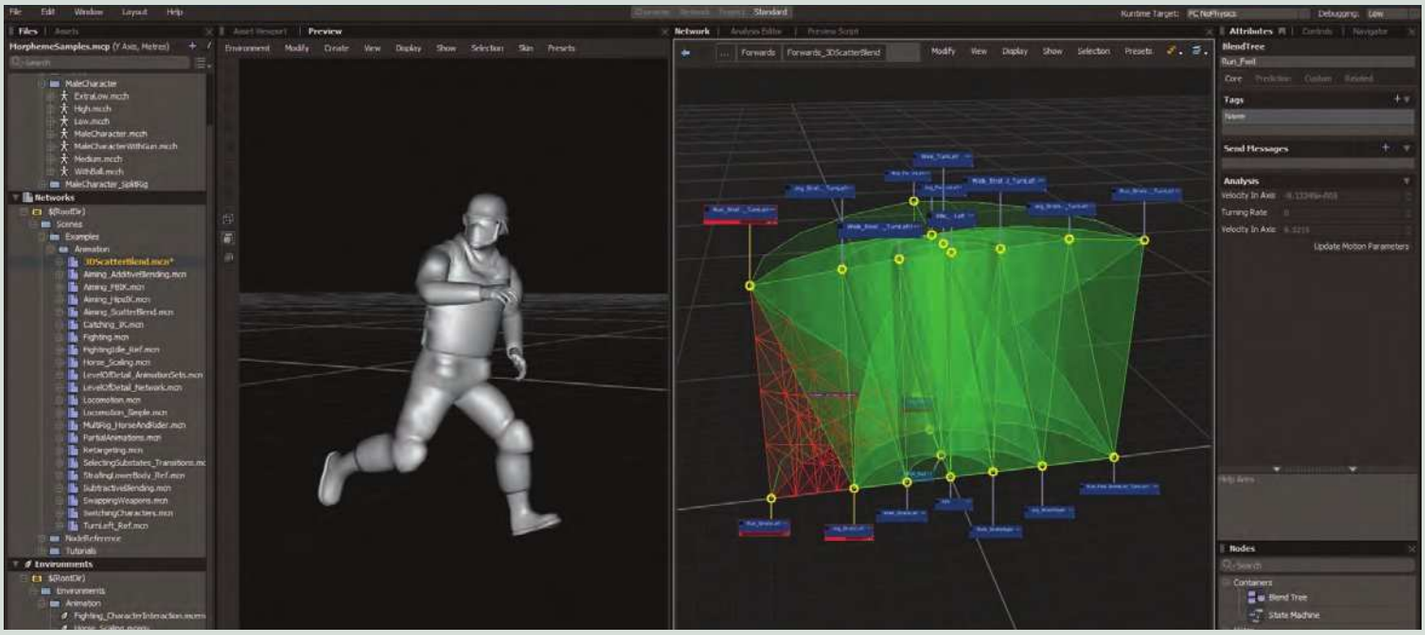
The whole project was integrated into a GitHub server using Sourcetree to manage iteration. "Ustwo was able to hear my changes as soon as they were 'pushed', meaning we had a pretty fast feedback cycle even though I worked remotely," says Bawler.

"This also meant we could try out ideas and demo stuff very quickly as well. *Monument Valley* is a puzzle game but it's also a journey – there's an experience there. It was conceived as almost like a work of art that you could hang on your wall – yet you can interact and play with it too. Creatively speaking, working on this title has definitely made me take a step back and think about music and sound design for games a little differently.

"When I'm working with composers in future, and when I'm involved with musical fx creation again, right from the design stage, I'll be taking a more holistic approach." ■

Monument Valley
Developer: Ustwo
Publisher: Ustwo
Platform: Android, iOS, Kindle Fire
www.monumentvalleygame.com

John Broomhall is a game audio specialist creating and directing music, sound and dialogue. Find him at: **www.johnbroomhall.co.uk**



KEY RELEASE

It's Morpheme time

NaturalMotion CEO Torsten Reil talks **James Batchelor** through the latest version of its animation tool Morpheme

What are the biggest or most important additions to Morpheme 6? Why are these important?
NaturalMotion's next generation of Morpheme and Morpheme with Euphoria offers many new features, starting with an improved core architecture that places emphasis on the project as a whole rather than just a single character at a time.

This shift to an overall project-centric workflow makes it easier to share assets within the project, as well as providing a much simpler way to navigate around it to make modifications.

Building on this core enhancement, we also greatly advanced the experience of previewing and debugging the performance of a character. This vastly improves the productivity of Morpheme users because they can make modifications during the preview and see the results updated live within the running game.

The workflow changes of Morpheme 6 are further enriched with a suite of new nodes to expand the availability of character animation techniques. For example, Morpheme 6 with Euphoria offers significant improvements to the fidelity of the selection of behaviours. In parallel, new behaviours are available such as a 'flinch' pain response for believable hit reactions. Similarly, the addition of a distributed Full Body Inverse Kinematics solution provides the potential for rich, procedurally generated animation. Morpheme 6 is available for the major gaming platforms, and Morpheme 6 with Euphoria is targeted at the newer generation of hardware, Xbox One, PlayStation 4 and PC.

What have you done to improve the experience for established users?
Many of the changes included in Morpheme 6 are centred on improving user workflows, with particular attention paid to the increase in size and complexity of projects that we have seen recently. Current Morpheme users will enjoy the new capability of making edits to the character's animation network during the live preview, which results in near instant iteration times to increase productivity.

Previously, we introduced a two-dimensional Scatter Blend to enable users to parametrically blend animations together. In Morpheme 6, we extended this to work in three dimensions. The goal for this component strives for a straight-forward and simplistic user experience as possible without sacrificing any of the power this functionality brings.

What have you done to improve the experience for newcomers?
For new users, NaturalMotion's Morpheme 6 and Morpheme 6 with Euphoria will introduce them to an innovative, single integrated animation system that holds massive implications on game design. The new project-centric workflow experience generates a much clearer visibility of the relationships between different assets to quickly comprehend how a change to one asset might address issues in all the places that use it within the game.

Additionally, the inclusion of an expression node makes it possible for programmers to write small elements of functionality to be executed at runtime. This makes it easy to prototype new ideas and eases the transition from a code driven animation system to a Morpheme GUI-authored and data-driven approach.

We've also added improved debugging to the runtime logic that is operating with each state machine at runtime.

What inspired the changes to Morpheme 6?
Our customers told us that, as their teams ramped up on increasingly larger projects, Morpheme needed to adapt to ensure it maintained its renowned ease of use as it scaled to larger projects.

Simultaneously, ideas are generated from within our internal development and research teams. These improvements are usually focused around the long-term roadmap for Morpheme that consistently builds on the technology and infrastructure to support the innovation of future features.

NaturalMotion prides itself on continuing to push the boundaries of character animation. ■

Morpheme 6 features an array of enhancements including a shift to an overall project-centric workflow aimed at easing the process of sharing assets within the project

UNREAL DIARIES

Unreal Engine 4 takes flight

Epic proves the versatility of its latest game engine with Tappy Chicken and Zen Garden for mobile devices

As well as powering top console and PC games, UE4 can be used for all types of mobile titles, as shown in the simple Tappy Chicken (above) and the high-end concept demo Zen Garden (main)

EPIC GAMES RECENTLY demonstrated its ability to touch both ends of the mobile gaming spectrum by utilising the studio's latest technology and tools, which can power more than just the latest triple-A blockbusters.

TAPPY TO FLAPPY

First, the release of *Tappy Chicken* for iOS, Android and HTML5 shows off the engine's ability to support lightweight, over-the-air deployment for mobile and the web.

Built in UE4 Blueprint visual scripting by one artist over the course of a weekend, *Tappy* is a simple app that pays homage to the often cloned *Flappy Bird*.

The completely free download supports leaderboards, achievements and ad support, with the web client clocking in below 10 MB and the mobile footprint barely nudging 30 MB.

The entirety of the app's content is available to UE4 developers starting with June's massive 4.2 release.

MOMENT OF ZEN

Pushing the very high-end of mobile is *Zen Garden*, a proof of concept demo first spotted on Apple's stage during the recent WWDC keynote. Epic founder Tim Sweeney and platform team lead Josh Adams were there to provide the first real-time, public demo of the new Metal API for iOS in action.

Sweeney says: "Metal is a low-level rendering API, which means it provides the absolute minimum layer of software needed to support multiple versions of different graphics chips. It shields developers from the very low-level implementation details. It replaces OpenGL ES, which is an ancient relic of the Silicon Graphics era."

According to Sweeney, developers transitioning to Metal "will see an immediate, significant improvement in the number of objects and the complexity of the scenes they can build." Epic's R&D efforts will naturally transfer to UE4 devs targeting iOS 8 and up.

"It was developed over a period of time that allowed us to provide valuable feedback for both Epic and Apple on guiding the API's authorisation efforts," adds Sweeney. "It's an example that developers can follow when looking at building high-end content that can run on these mobile devices now."

For more information on these efforts, visit unrealengine.com, and view previous Twitch broadcasts at YouTube.com/UnrealEngine. ■

UPCOMING EPIC ATTENDED EVENTS

Develop Conference
July 8th to 10th
Brighton

GDC Europe
August 11th to 13th
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POWERVR IN ACTION

Smart cars

Imagination Technologies asks Codemasters' Dean Bilotti about bringing console-quality graphics to mobile

How have you adapted your technology for the mobile market?
Codemasters has always been platform-agnostic and our core tech for the past generation – the Ego game technology platform – was designed and built to deliver optimum performance across console and PC platforms.
A new generation of Ego is now being developed for the new consoles, high-end PC and now mobile too.
F1 Race Stars is our first title to benefit from this and delivers console-quality visuals, including high dynamic range rendering with bloom, an extensive range of full-screen post-process effects (such as blur, anti-aliasing, dynamic weather) and much more.

What were your main concerns with bringing high-end games to mobile?
From a technical standpoint, the major concerns we had were largely performance-based. OpenGL ES 2.0 as an API appeared to have most of the capabilities we required to adapt the Ego engine for mobile. However, we were unsure how big the gap between console and mobile performance was and whether an adaptation of a heavyweight console engine was even possible.

How did the mobile development tools affect your production pipeline?
We're used to having to support multiple platforms with the same codebase and tool-chain, so adding another platform wasn't entirely new to us. However, PC and console games development takes place almost entirely on a Windows PC within Visual Studio. iOS development provided the biggest shake-up for our teams – they had to switch to Apple hardware and an entirely new development environment.

We've been happy that we can use the same languages and similar APIs that we use on console and were pleasantly surprised to find most of the tools that we expect in the console world were also available to us on mobile. The Apple Xcode development environment gave us all the CPU and GPU debugging capabilities we need.

> ***"Mobile GPUs such as the Series6 PowerVR have nearly caught up with Xbox 360 and PS3."***
> Dean Bilotti, Codemasters

GPU manufacturers such as Imagination Technologies provide tools like the PVRTexTool and PVRTexLib, which we integrated into our pipeline to support mobile compressed texture formats. We used the PVRShaderEditor to analyse and optimise complex shaders and PVRTune and PVRTrace to do even more in-depth GPU analysis.

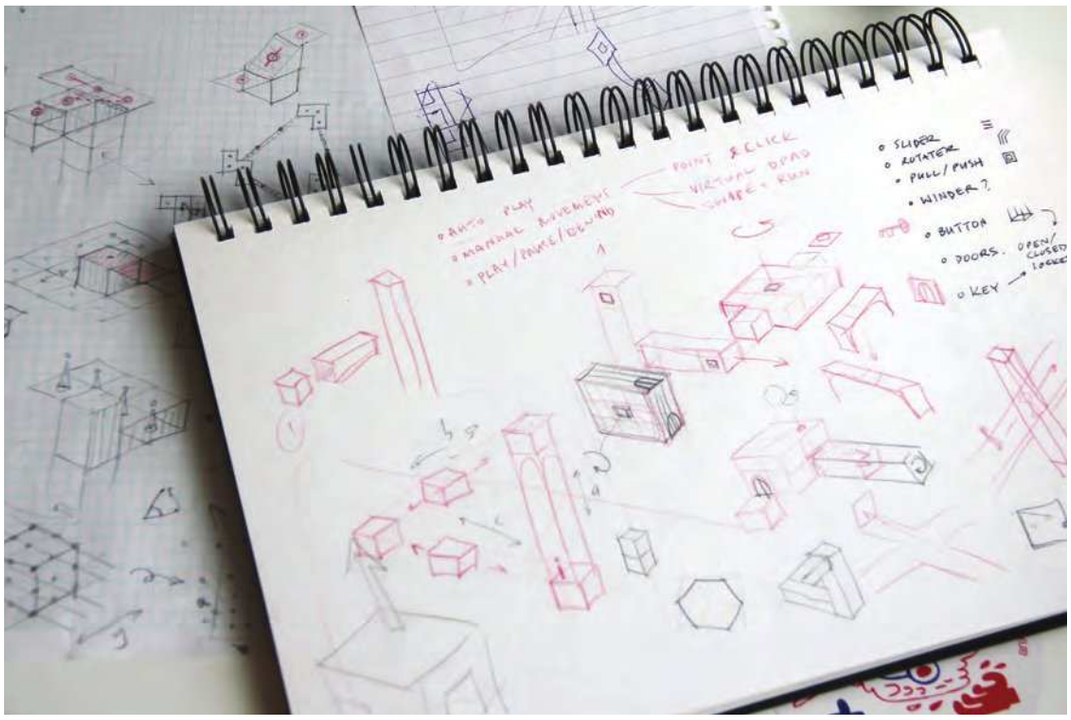
How re-usable were the assets from the original console games?
Completely re-usable. All mobile tracks were designed from scratch as we felt that shorter tracks were more suited to quick gaming sessions on the go. But most of the assets used to build them were taken straight from the console version: drivers, cars and animations. This means *F1 Race Stars* is built to console specification, yet with gameplay and game mechanics geared to the mobile player.

One of the main features we'd thought we would need to forgo on mobile was the full-screen post-processing effects that give console content a higher-end look. We were incredibly excited when we ran our first performance tests and discovered that modern mobile GPUs definitely have the required compute performance to enable almost all of these effects, even at the higher resolutions.

What are you looking for in mobile GPUs going forward?
As a developer, you can never have enough performance. Modern mobile GPUs such as the Series6 PowerVR, have nearly caught up with the Xbox 360 and PS3, certainly in terms of compute performance, but the new generation of consoles, the Xbox One and PS4, take another leap forward.

We're looking forward to seeing if mobile GPUs can close that gap and how quickly they close it without reducing battery life to unacceptable levels. ■

Codemasters' Dean Bilotti (above) says modern mobile GPUs are powerful enough to deliver console-quality graphics, which it took advantage of in F1 Race Stars



UNITY FOCUS

Monumental efforts

Peter Pashley, technical director at Ustwo, discusses the origins of indie hit Monument Valley

The Unity engine played a pivotal role in enabling Ustwo to easily create the mind-bending levels in Monument Valley (main)

Why did you choose Unity when developing Monument Valley?
Our first game, *Whale Trail*, was built in our own C++ engine but we decided to try out Unity while building the following game, *Blip Blup*. When we started prototyping ideas for the next game, it made sense to continue using Unity because it was so easy to chuck together a quick test for any idea. Our prototyping methodology is to spend up to one week on an idea before asking ourselves if it's a go-er. With *Monument Valley*, we had a test level including impossibility and geometry manipulation up and running within the week.

We then spent another month or so properly prototyping the navigation tech and testing out gameplay ideas. We wanted the game to be 'all killer, no filler' so we knew that we would need to do a lot of iteration on both the gameplay and art for each level. We didn't want the tools to get in between the developer and the game, so Unity's WYSIWYG editor, rapid build-test loop and user-friendliness made it a very good fit.

How did the tech help you achieve the unique art style you were aiming for?
Our lead designer Ken Wong knew from his first piece of concept art that he wanted a very clean, simple look for the game. We ended up writing all our own shaders, using a custom directional lighting model instead of the standard Unity surface shaders. The final look combines that custom lighting with Unity's standard lightmapping tech (for static ambient occlusion) and some hefty overdraw for vignetting and faked volumetric glows. Being able to rapidly iterate textures, shaders, textures and particles inside the Unity editor was invaluable to achieving the final result.

How did it cope with the optical illusion, level-shifting puzzles in the gameplay?
Navigation was the biggest unknown when we started the project, for several reasons. Firstly, the game is built in 3D with most structures only making sense from the single (orthographic) camera angle. This meant that navigation made no sense in a 3D world space; navigable areas were often not 'physically' connected, they were only ever adjacent from the camera's point of view.

> ***"Our prototyping methodology is to spend up to one week on an idea before asking if it's a go-er."***
> Peter Pashley, Ustwo

Secondly, we wanted our structures to move, to reconfigure. This meant we couldn't simply hardcode the 'impossible' connections – they had to support so many different geometry configurations that it was completely unrealistic to use manual mark-up.

Thirdly, our characters had to be able to locomote on these impossible connections whilst still appearing to be connected and properly occluded by other geometry. Any lapses would completely break the player's suspension of disbelief.

Finally, we wanted this to work in real-time. We wanted someone designing a level to be able to move some geometry, hit play and navigation would just work. No extra steps, everything as WYSIWYG as possible.

All this meant that we had to create a new navigation mark-up, route-planning and locomotion system from scratch. We also had to fall back to the legacy animation system because we needed frame-accurate animation sampling to cope with all the teleportation that the character had to do.

The second part of supporting the puzzle gameplay was being able to script the various sequences that the player triggers. We wanted this to be accessible to everyone who was working on level design, and to use standardised methods across different levels, so we created a system where a wide range of animation and state events could be scripted using a drag-and-drop system in-editor.

What single piece of advice would you give to games developers that are new to using Unity?
Take your time. Make something small first to properly understand how Unity works and play to its strengths.

Be open-minded – even if it's not how you are used to implementing something, find out how Unity expects it to be done and go with the flow. ■

GEOMERICS SPOTLIGHT

The light side of R&D

Geomerics' next collaborative research and development project takes them to a galaxy far, far away. Founder **Chris Doran** discusses the value of these projects and how to attract funding for such a venture

GEOMERICS RECENTLY WON its fourth collaborative R&D award from the Technology Strategy Board (TSB), leading a project with Industrial Light and Magic, Electronic Arts and Disney Research.

Our goal is to push real-time game lighting technology to the point where it can be used in the film production pipeline, and we will have the opportunity to work directly with *Star Wars* film content, undoubtedly the most exciting project we have been involved in to date.

Looking back, research awards like these were often crucial to the progress of Geomerics. Our first award was received in 2006 for research with Cambridge University looking at animated characters and lighting. This led to the character lighting solution in the first version of Enlighten. But the importance of the grant went well beyond the technology. It gave the investors comfort that we knew what we were doing. Winning a grant award in a competitive environment demonstrated that other people agreed with our technical direction and made it easier to attract follow-on funding.

Our second award was for a more ambitious project collaborating with the Computer Graphics Department at UCL. This three-year project started in 2008, and the key technical challenge we investigated was scaling Enlighten from its initial prototype to technology that was appropriate for large high-end games. Developers were making demands of scale far beyond our early prototypes. The research funded by the grant was critical to our ability to deliver technology to DICE, for example, as well as generating research papers and PhD material for UCL.

Not all of our Technology Strategy Board projects have been collaborations with universities. Our next project, which started in 2009, was with another UK business and looked at applying game technology to the problem of managing a complex IT infrastructure. This project led directly to the formation of a spin-out company, which went on to raise investment and build its own team. This highlights how R&D grants can be used to investigate spin-out possibilities.

> ***"Research awards like those from the TSB were often crucial to the progress of Geomerics."***
>
> Chris Doran, Geomerics

Despite this success, my preference is to have an academic partner on board so that someone on the team can step back, carry out a thorough literature search, and plan the research properly.

KNOWLEDGE IS POWER

Geomerics is also part of an EU project looking at mobile GPUs. We joined this team as they needed a partner with experience of high-end GPU applications. The project timing was ideal for us as it helped fund our move into mobile. EU projects are not as scary as they may seem, but if you are going into one, make sure you find a lead partner with experience of these projects. The odds of a successful bid for a project led by a partner with no experience are tiny.

Many companies are put off applying for R&D grants by the paperwork and the competitive element of the award. It is frustrating putting effort into a proposal only to lose out, and we have not been successful with every application. My view is that you should treat applying for these awards as you would a sales opportunity. You won't win them all, but you shouldn't give up trying. The Technology Strategy Board runs a two-step process for most of their competitions, and entering the first stage is not much work. If you do get through, you are in a position where 50 per cent of projects will be funded, and with those odds it's worth the effort.

My final advice is, if you have anyone with an academic background in your team, ask them to write the proposal. The skills are quite similar to those academics gain through applying for research grants. I would urge any technology company in the games industry to seriously consider applying for the next round of awards. ■

Dr Chris Doran is founder of Geomerics. He frequently offers free advice to UK technology companies thinking about applying for R&D grants.

Geomerics aims to bring game lighting technology to film quality, and it has been given the opportunity to work directly with Star Wars (main) film content to achieve this goal

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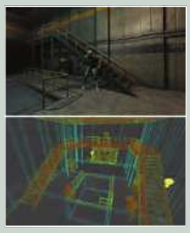

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TRAINING SPOTLIGHT

This month: **Arvon**

Arvon
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ARVON RUNS AN annual programme of residential courses and retreats for aspiring creative writers, and has incorporated a week-long study of games writing to its long list of available courses.

Tutors explore both triple-A and indie examples in storytelling through a series of open workshops and one-to-one tutorials, with time also made available for pupils to work on their own projects as well.

"There are very few short courses that deal specifically with writing for interactive media," says Arvon tutor and writer David Varela, whose works include mobile titles *Sherlock: The Network* and Space Ape's *Samurai Siege*.

"We teach games developers about how to write – or work with writers – and we teach established writers from other media about how to write for games.

> ***"It's no coincidence all three of us have recent Develop Award nominations."***
>
> David Varela, Arvon

"It's only a week-long course, but it's residential and intensive. We're based in Ted Hughes' old farmhouse and I think a combination of the isolation and the literary history make for a really inspiring atmosphere. Eating, drinking and working with a dozen people like this can forge some incredibly strong friendships. One student last year called it 'the best week of her life'."

Varela says the idea is to broaden people's horizons by educating them on just how many types of game there are and what stories they could tell in them, teaching skills that can be transferred into a variety of genres.

The retreat has a number of famous games writing staff on its team, including Varela himself and Steven Hall, who has written for Crytek on a number of titles such as *Ryse: Son of Rome* and *Crysis 3*. *Tomb Raider* writer Rhianna Pratchett, meanwhile, is an industry guest tutor at Arvon, and they are all helping to ensure pupils are learning from those with experience in games.

"It's no coincidence that all three of us have recent Develop Award nominations for Use of Narrative," states Varela. "We draw on our experience outside games to make games writing better."

A single room at Arvon costs £700, but as the course is accredited by Creative Skillset, those already working in the games industry can save 50 per cent off the price.

David Varela (left) says Arvon offers intensive residential courses (above)

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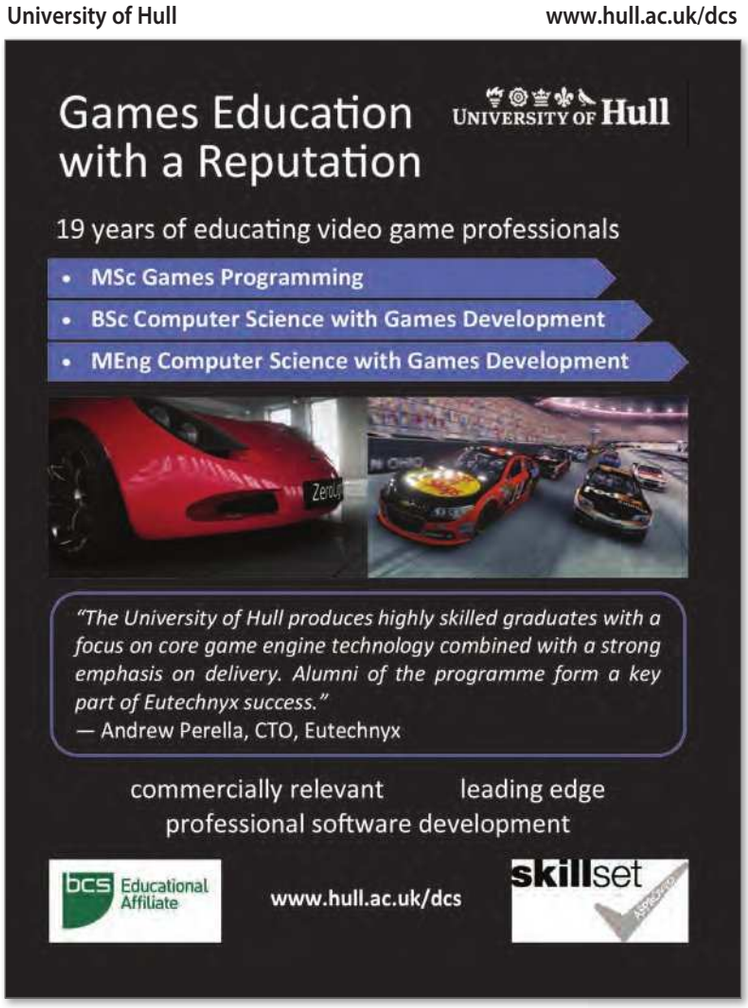
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LEADWERKS IS MAKING huge strides in the Linux games dev space, with its engine available on Steam, the Ubuntu Software Center, and its website.

The tool comes in two forms: the Indie Edition that allows Lua programming and can be purchased on Steam and the firm's website for $99.99, and the Standard Edition, which adds support for C++, and can be bought as an add-on for an extra $99.

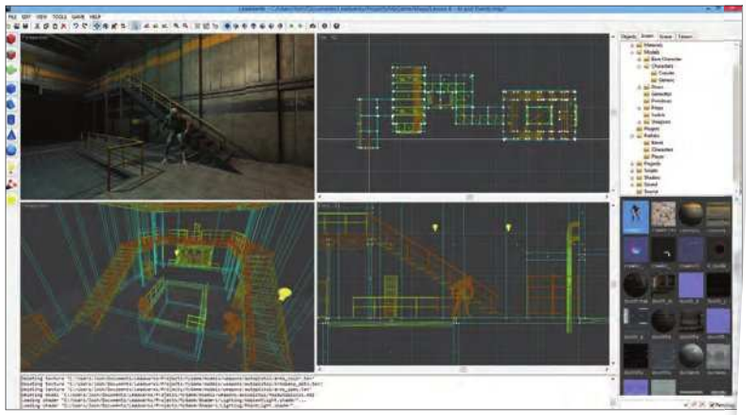
The engine includes built-in level design tools, a script editor, an OpenGL 4.0 deferred renderer with a uniform lighting model and many other features.

The tech supports Windows and Linux, with OSX support coming soon.

Version 3.2 is now rolling out on Steam, and with it will come the Leadwerks Workshop. This will allow the company to deliver game-ready items and will also enable developers to publish their titles directly to Steam.

"You can upload your game to the Workshop for others to play immediately, with no waiting period and no approval process," Leadwerks CEO Josh Klint tells *Develop*.

"This is a good way to get early feedback during development and start building a fanbase in the run-up to your Greenlight campaign."



Leadwerks Josh Klint (right) says the engine (above) allows developers to work natively in Linux

Klint says the focus on Linux game development came as a result of the platform gaining increased traction in recent years.

And following Leadwerks' successful Kickstarter campaign last year, he says the company is working on ways to deliver content more easily to Linux and SteamOS without having to compromise on quality.

> ***"You can upload your game to the Workshop immediately, with no waiting period or approval."***
>
> Josh Klint, Leadwerks

"We received pretty strong affirmation during our Kickstarter campaign that this was the right move to make," he says of the company's adoption of Linux. "I think this forces us to make sure our Linux implementation is really first-class. There's nothing worse than a bad port. I've been developing for Linux for over a year, and all the lessons I've learned during that time will give us a better product for SteamOS."

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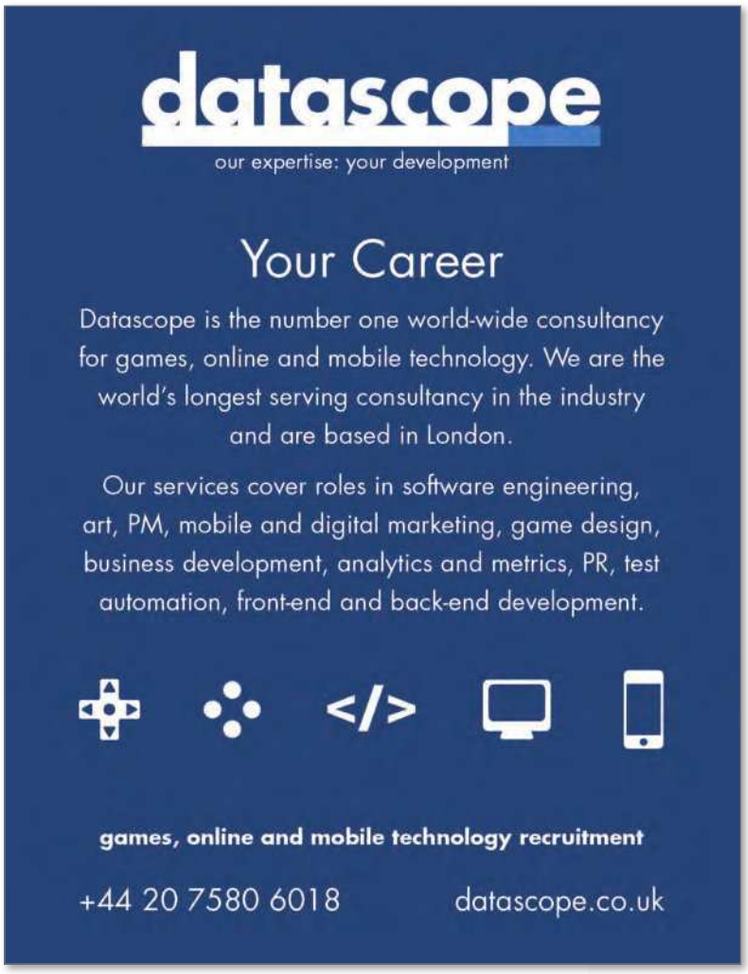
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SERVICES SPOTLIGHT

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APPROACHING ITS THIRD birthday, d3t is a fast-growing IT company that provides a unique source of high tech games development and programming expertise.

By late summer the Runcorn-based business, launched by two industry veterans, will have experienced three profitable years with 50 per cent growth in both 2012 and 2013, and will have doubled the size of its technical team thanks to ever-increasing demand for its services, especially from overseas.

Services offered by the company include porting, web services and back-end development, optimisation, rendering, networking, rapid prototyping, smartphone and tablet application development and full game development.

"We have a wide range of expertise in-house that client companies can benefit from," says d3t commercial director and co-founder Jamie Campbell. "Although we have vast experience in the computer games sector, our expertise covers a huge area including business-to-business software development."

Campbell's co-founder and development director of d3t is Steve Powell, who he has worked with since 2001.

Both were founding members of Warrington-based Juice Games in 2003, also known as THQ Digital Warrington, but it was Campbell and Powell's redundancy in 2011 that led them to launch their own business.

The core team at d3t from left to right: Jamie Campbell, Noel Austin, Andrew Booth, and Steve Powell. The foursome have already worked with some big clients

> ***"Our mission is to make our skills available to clients to remove dev headaches."***
>
> Jamie Campbell, d3t

"That was when we had the idea of forming d3t, a business which would offer our combined skills to a wider audience in the business world. In fact the name d3t is an acronym for designing, developing and delivering excellence in technology to our clients," explains Campbell.

"Steve and I discussed the project in detail, we both liked the concept and together we launched the business using some of those excellent people we had worked with before."

Not surprisingly many of d3t's first clients came from the gaming world. One of their first commissions was to work on Cold Beam Games' *Beat Hazard Ultra* and that was followed by many other published games, as well as covert technology consultancy for a multitude of studios.

More recently they won a commission to work on another game, *Lemmings Touch* for Sony Computer Entertainment's XDEV Studio Europe.

It has also worked on the likes of Yippee Entertainment's *Chimpact* (PSM) and Guerrilla Games' PS4 launch title *Killzone: Shadow Fall*, to name just a few.

"At d3t we are technophiles, not just gamers, so we were delighted when we were asked to work as technology partners for a vehicle tracking organisation, developing smartphone apps, web services, firmware, and back-end as well as front-end systems," says Campbell.

"With career backgrounds including business software development and embedded systems, we knew d3t was about more than games and as time went by we began to attract clients from all sectors."

He adds: "The future for d3t looks extremely bright as our message continues to reach decision makers in the business world. Our mission is to make our unique in-house expertise and skills available to clients who want us to remove development headaches and meet challenges, and that is exactly what we're doing."

d3t has worked on a host of games including Beat Hazard Ultra (top), Killzone: Shadow Fall (above) and Chimpact (right)

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THE FAQ PAGE: NATHAN VELLA

Develop grills respected figures from the global games industry

Nathan Vella (below), co-founder of Capybara, which is currently working on Below (right) says one of his favourite games ever was FPS Tribes, as it required real teamwork for players to succeed

Who are you and what do you do?
I'm Nathan Vella, co-founder and president at Capybara Games.

What are you working on right now?
Capy just released *Super Time Force* on Xbox One and Xbox 360, and at the same time we've been working on our next game *Below* for PC and consoles.

What was the first game that you ever worked on?
While we were working part-time to get Capy started, I was an artist on one of our first titles, *Super Shove Shove*. It's a puzzle game about expansion, contraction and… shoving. I still love that darn game, especially since we made a version that was under 64kb.

What was the first video game you ever played, and did you enjoy it?
My father believed that computers were an extremely important part of my education, so he bought my siblings and I a Commodore 64. I played hundreds of games on that machine, and the first I really remember digging into was *Spy Hunter*. I felt like James Bond. Beyond that, the first truly impactful gaming experiences I had that really made me think about games in a different way were Chahi's *Another World* and *Final Fantasy II*.

What's the most recent game you played?
I was lucky enough to get to playtest *Hohokum* very recently. That game is a special intersection of the things that I love about games aesthetics, interaction, whimsy, exploration, invention, music and focus. While many developers are fighting over how to best achieve one or two of those elements, Ricky and Dick have grabbed them all and made them sing together. Can you tell I loved it?

> ***"I am disappointed that there are so few games about, or even featuring, dinosaurs."***

What is your favourite game ever, and for what reason?
I have at least 20 favourite games ever, but I will talk about one: *Tribes*. My cousin got me into this amazing team-based FPS, and after my first hit I was hooked. It's one of the most creative and unique games that has ever been made. It gave players a massive playground of interactions all within the FPS bubble, and just asked them to play together.

From skiing and freedom of movement to loadouts to playing within roles to map design, I genuinely believe it's the only team-based shooter than actually mandates team play.

What area of the industry do you think needs more 'investment'?
I think we can all agree that we need to invest in diversity. I can't think of anything that will net a better return for games than an investment in having a wider group of people making them. And I mean "net a better return" in many ways: financially, creatively and culturally.

What do you enjoy about the games industry today?
Although I fully believe the industry to be the most creative, passionate, interesting sector out there, I think the best part about it is the people. Between the crew here at Capy and all the amazing folks making games worldwide, I am constantly floored by how special the people that make games are.

What disappoints you about the games industry today?
I am pretty disappointed that there are so few games about, or even featuring, dinosaurs. Dinosaurs are pretty cool.

What other video games developer do you most admire?
I admire anyone working hard to make something cool in games, and I especially admire people who have managed to create "special" places for the creation of games to occur. I think Media Molecule is an amazing example of this, as is The Behemoth and Supergiant Games.

I've been lucky enough to gain many mentors and friends in this industry so my Admiration List is over ten pages.

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